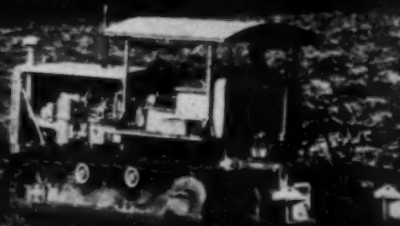


IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

DIESEL PROGRESS

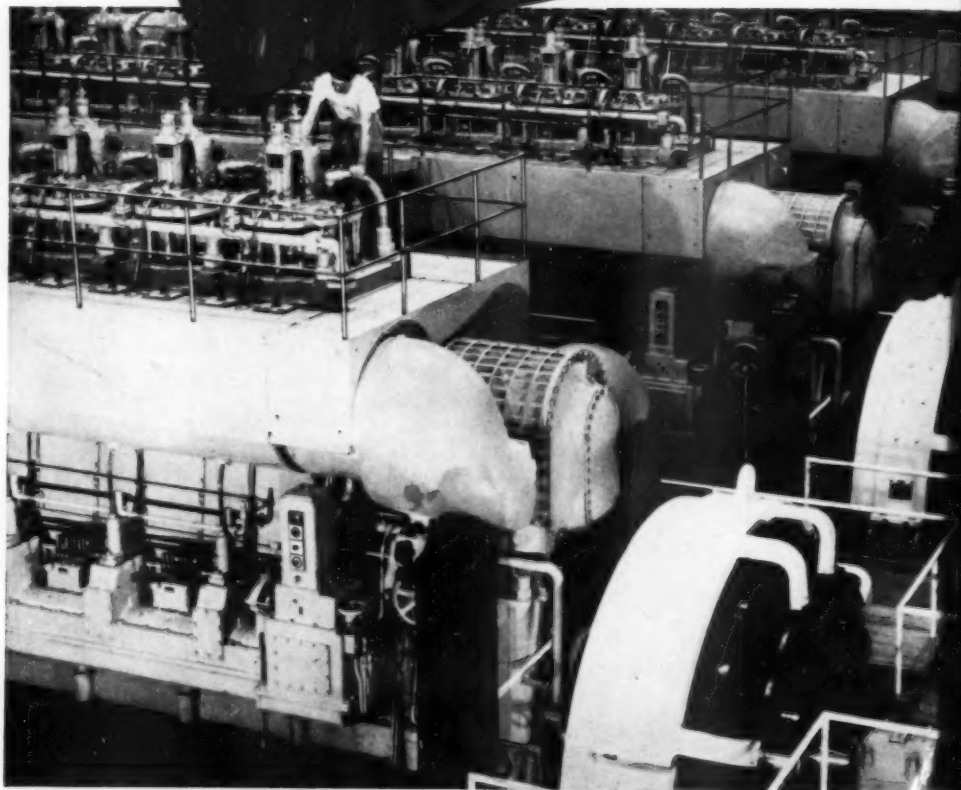


FIVE DOLLARS PER YEAR

NOVEMBER, 1951

FIFTY CENTS PER COPY

YOU CAN REDUCE fuel consumption



TUNE IN . . .
TEXACO STAR THEATER
starring
MILTON BERLE
on television
every Tuesday night.
See newspaper for
time and station.



TEXACO

YOU CAN REDUCE maintenance costs

... by lubricating with **TEXACO URSA OIL**


Diesel, gas or dual-fuel engines — all run better and cleaner when the lubricant is *Texaco Ursa Oil*. This is the oil with *extra* resistance to oxidation . . . *extra* ability to keep rings free, ports clear, valve action snappy. You can be sure of proper compression and combustion . . . lower fuel consumption.

Maintenance costs are lower, too, because *Texaco Ursa Oil* wards off wear with a tough, friction-fighting film that stands up through the severest kind of service. All moving parts last longer.

There is a complete line of Texaco Diesel lubricating oils — a viscosity to meet every operating condition. They are approved by leading engine builders and preferred by operators everywhere. In fact —

More stationary Diesel h.p. and more railroad Diesel locomotives in the U. S. are lubricated with Texaco than with any other brand.

A Texaco Lubrication Engineer will gladly show you how effective lubrication can step up Diesel efficiency and economy in your plant. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



Engines in a mammoth aluminum plant — one of the world's largest internal combustion plants — include 18 Nordberg Gas-Diesels which are lubricated with Texaco Ursa Oils exclusively.

URSA OILS FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES



**...regulate the Speed of these Clark Bros. Co.
Compressors in Gasoline Plant of Midland Gas Co.**

The **m** *Marquette*

METAL PRODUCTS CO.

CLEVELAND 10, OHIO

DIVISION OF CLARK-BROS. CORPORATION

SOLE AGENTS FOR THE MIDDLE WEST
CLARK-BROS. CORPORATION
CLEVELAND, OHIO

here's GOOD NEWS for the TAXPAYERS...

LEW GARY
MAYOR
HOUMA
LOUISIANA
GEORGE J. ATTY, JR.
WILLIAM J. TERRY, JR.
PAUL V. RATHIEL
LUCAS MARTELLO
CHRISTOPHER L. OLIVER, JR.

Mr. Roland Bayerlein
Nordberg Manufacturing Co.
Milwaukee, Wis.

Dear Mr. Bayerlein:

I wish to inform you on the operation of the three
TSC 215 natural gas burning diesel engines that we pur-
chased from your company and which equipment has been in
service in our city for over one year.

We are more than pleased with the generating cost
of these units. We were pleasantly surprised to learn
that we could operate on less than 3¢ pilot oil. Our
municipal system has, during the past year, paid the an-
nual installment on the bonds required for the installa-
tion of this equipment out of the additional profits
realized from the economical operation of natural gas
fuel generation. In addition, we realized over and above
our bonded indebtedness an additional profit of \$30,000.00
for the fiscal year ending 1950. This means to us that
our present operation over our former operation allows us
to pay for the equipment while we are realizing an addi-
tional profit.

I am passing this information on to you because I
know of the interest that you took in this plant during
its construction.

With every good wish, I remain,

Sincerely,

Lew Gary
Lew Gary
Mayor

LG/s

NORDBERG Gas Burning Diesels pay for themselves... *plus* a profit bonus!

This unsolicited letter from Mayor Gary, of
Houma, Louisiana, speaks volumes for the
economy and performance of Nordberg
Dualfuel* Engines. The three gas burning
units serving this progressive municipality
were installed as a result of the foresighted-
ness of Mayor Gary and his associates.
Each of these engines develop 2000 hp at
225 rpm, generating a total of 4230 kw in
Louisiana's largest Diesel plant.

Can your city point to profitable power
plant operation like this? If not, it will
pay you to investigate the dependable,
economical service available with
Nordberg Diesels... in sizes from 10 to
9600 hp. Write for details, outlining your
power requirements.

*Trade Mark for Nordberg engines burning oil, gas
or a combination of both.

NORDBERG MFG. CO., Milwaukee 7, Wisconsin

RUSCH-SULTZ
A DIVISION OF HANSON

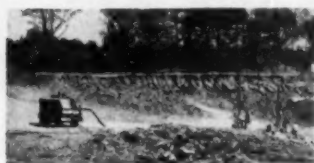
NORDBERG
DIESEL ENGINES



GM DIESEL powers world's most compact 600 cfm Compressor



CONSTRUCTION—"Starts like a charm, even on the coldest morning. No time wasted in getting up to pressure. Runs a heavy pile driver with ease. We can set it out of the way with a crane and move it back to the roadway for towing in no time."



QUARRYING AND MINING—"We couldn't imagine 600 feet coming from such a slick little compressor until we saw the increased drill footage, and the ease with which it took over two FM-2 wagon drills. Good fuel economy, too."



HIGHWAY BUILDING—"Plenty of reserve—full capacity at 6,750 feet altitude. We're operating eight 55-lb. blower drills putting in 20-ft. holes on cliffsides. So easy to maneuver and work with that it's a natural for tough jobs like this."



WINNING acclaim as the world's smallest, lightest, big-capacity portable compressor, the new Ingersoll-Rand Gyro-Flow 600 is powered by a 6-cylinder General Motors Series 71 Diesel engine.

This compact, high-powered portable delivers a full 600 cubic feet of air per minute at a steady 100-lb. pressure, yet it weighs only 9,500 pounds. It is 20 to 40% lighter—and as much as 20% smaller—than other portables of comparable capacity.

Being 2-cycle, GM Diesel engines pack more power in less space. They start quickly on their own fuel, run smoothly and enable equipment to maintain rated performance at high altitudes. They're designed for ease of maintenance—no high-pressure fuel tubing—unit injectors that can be changed in a matter of minutes. And, when needed, low-cost "Factory-Engineered" parts are readily obtainable.

These modern 2-cycle Diesels are bringing new economy and efficiency to more than 500 different kinds of power equipment built by 120 manufacturers. Ask your GM Diesel distributor or write us for full details.

ANSWER



THE CALL
CIVIL DEFENSE

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES...Up to 275 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS...Up to 800 H.P.

GENERAL MOTORS



GENERAL MOTORS
**DIESEL
POWER**

DIESEL BRAVN WITHOUT THE BULK

STANDARD ENGINEER'S REPORT

DATA	<i>RPM Delo Oils</i>
LUBRICANT	<i>#450 International gasoline engines</i>
UNIT	<i>Heavy hauling</i>
CONDITIONS	<i>1 1/2 years</i>
PERIOD	<i>Kenneth Poorman Co., Portland, Oregon.</i>
FIRM	

Rings "perfect", only 0.001 cylinder wear after 80,000 miles!



RPM DELO OILS eliminated all stuck rings, scoring and deposit trouble in 21 units like these, hauling loads up to 72,000 pounds on construction jobs. 80,000 miles after switching to RPM DELO Oils a

check showed: "Rings so perfect they could have been put back in the engine. Average cylinder wear only 0.001 inch," according to Maintenance Supt. C. H. Johnson, Kenneth Poorman Co., Portland, Ore.



"100,000 MILES IS NOW OUR OVERHAUL PERIOD, but the way RPM DELO Oils perform, I believe we could extend it to 200,000 miles," says Mr. Johnson (left), shown here with Manager Joe Stephani. RPM DELO Oils have made many outstanding service records in all types of heavy-duty gasoline and diesel engines. They will keep your engines clean, reduce wear and cut operating costs. One of these will meet the operating conditions in your heavy-duty engine: RPM DELO Heavy Duty, RPM DELO Special, RPM DELO Supercharged-1 Oil, RPM DELO Supercharged-2 Oil.

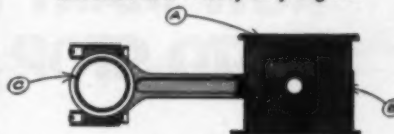


FREE BOOKLET on the RPM DELO Oils gives you complete information. Write or ask for it today.

TRADEMARK "RPM DELO" REG. U.S. PAT. OFF.



How RPM DELO Oils reduce wear, corrosion, oxidation in all Heavy-Duty Engines



- A. Contain special additives that provide metal-adhesion qualities...protect parts whether hot or cold, running or idle.
- B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring-sticking. Detergent keeps parts clean...helps prevent piston scuffing.
- C. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA
225 Bush Street • San Francisco 20, California

THE CALIFORNIA COMPANY
P. O. Box 780 • Denver 1, Colorado

STANDARD OIL COMPANY OF TEXAS
P. O. Box 262 • El Paso, Texas



HOW MANY TONS OF IRON TO STOP A TRAIN?

NOT LONG AGO the Santa Fe *El Capitan* wore out a ton and a quarter of iron brake shoes every 4500-mile round trip between Chicago and Los Angeles.

Today, thanks to General Motors Diesel locomotives, brake-shoe wear has been cut seventeen hundred pounds per round trip—saving on this one passenger train alone more than 600,000 pounds of iron a year. In freight service, the national savings in brakes and

wheels on railroads using General Motors locomotives runs into thousands of tons annually!

This is because of a special brake applied first on the Diesel locomotive by Electro-Motive. It's the "dynamic" or electric retarding brake—an ingenious device that permits slowing a train at any speed without applying brake shoes to the wheels at all. The engineer simply moves a lever which

converts the traction motors into generators. As generators they resist motion, so act as brakes—like braking with the engine in your car.

Add this saving to the many other advantages and economies proved in 17 years of main-line service, and it's easy to see why General Motors Diesel locomotives are one of America's greatest defense assets.



Home of the Diesel Locomotive

ELECTRO-MOTIVE DIVISION

GENERAL MOTORS • LA GRANGE, ILL.

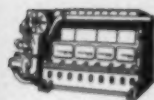
In Canada: GENERAL MOTORS DIESEL, LTD., LONDON, ONT.

Diesel Engine Staying Power



Upped

BY THESE 4 STEPS



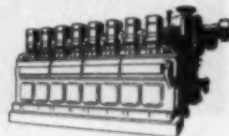
1st step: Examine Cities Service lubricants for out-and-out quality through your purchasing experts or test facilities . . . or from service records established by critical users.

2nd step: Look into the completeness of the Cities Service line as an aid to simplified ordering and prompt, steady supply . . . backed by the extensive facilities and intensive cooperation to keep you out of any lubrication "jam."

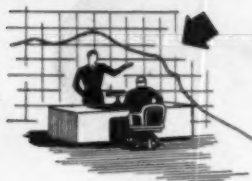
3rd step: Review today's most effective Diesel lubrication practices by consulting that fully informed specialist, the Cities Service Lubrication Engineer.

4th step: Ask for facts about the high character of the Cities Service line and the practical technical assistance now upping Diesel staying power for many of industry's "hardest drivers." Phone or write CITIES SERVICE OIL COMPANY, Room 197, Sixty Wall Tower, New York City 5.

CITIES  SERVICE
QUALITY PETROLEUM PRODUCTS



Beat In-Service Problems...



GUN IRON CAST PARTS

Emphasis, today, is on in-service economies, for two reasons: maintenance costs come high, and the critical need is to keep equipment on the job. And that's just one reason diesel manufacturers and operators in greater number are specifying Gun Iron for cast wearing parts. In thousands of applications, Gun Iron cast parts—superior in physicals—have demonstrated long life, PLUS lower operating costs.

Produced in air furnaces, "cooked" like open-hearth steel, Gun Iron has exceptional resistance to frictional wear, high heat, pressure, and erosion. Any of its many useful properties can be "pointed up" to meet your requirements exactly.

For diesel parts that are high in service

life, low in service cost, investigate economical Gun Iron. You'll find our engineers and laboratory technicians ready and willing to help you discover Gun Iron's wide-margin advantage service-wise. **HUNT-SPILLER MANUFACTURING CORP., 387 Dorchester Ave., Boston 27, Mass.**

Canadian Representatives: Jos. Robb & Co., Ltd., 4050 Namur St., Montreal 16, P.Q.

HERE IS A PRACTICAL GUIDE for the user of iron and steel castings... 24 pages of technical data on many types of metals and alloys. Write for your free copy.



**HUNT-SPILLER
DIESEL PARTS**

Controlled Quality...

From FURNACE
to FOUNDRY
to FINISHING

HUNT-SPILLER HUN IRON
MANUFACTURING PROCESS

New Trail for WHISTLING ELK



In the shadow of Bear Butte, sacred Indian mountain, Myrl Clark's International TD-18A crawlers each doze up to 2,000 tons of gravel from pits in 14-hour double shifts.

Myrl Clark, South Dakota's largest gravel contractor, steps up output with International power, at site where Indian medicine man predicts end of war

Bear Butte, South Dakota, is the sacred mountain of the Cheyenne Indians, where Chief Whistling Elk interprets the dreams of his tribesmen and forecasts the end of the Korean War. (He correctly predicted V-J Day five years ago.)

Whistling Elk gets to Bear Butte on South Dakota State Highway No. 24—and he'll get there easier and faster with Myrl Clark's resurfacing of the highway with gravel dozed from pits just below Bear Butte.

Clark confines his predictions to forecast finishing his job in half the contract time. Helping him deliver are three International TD-18A crawlers, each dozing up to 2,000 tons of gravel in 14-hour double shifts in the pits.

Clark and his men believe in the

International TD-18A. Just listen:

"Easier to work heavy loads," says Clark.

"Lots of power—especially that second gear," says operator P. Hensley.

"Don't lose time in the morning because they start fast," superintendent Charles Nohava puts in.

"Gets back fast after a big push to the gravel crusher trap for another load," says operator Rolland Haskell.

Isn't that the kind of performance you want on your jobs? Then see your International Industrial Distributor for the whole story on International "Power that Pays!"

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

INTERNATIONAL



POWER
THAT
PAYS

At right—one of two pumping stations serving Corpus Christi storm sewer system. Note "OC-H" filter at air intake of each of the three engines (pictured below).



AAF FILTERS Man the Pumps at Corpus Christi

CLEAN AIR HELPS KEEP ENGINES FIT FOR VITAL CITY DRAINAGE OPERATION

When it rains it pours in Corpus Christi, Texas, (as much as 2 inches in 30 minutes). Important links in this city's storm sewer system are two pumping stations. Their job—to handle all drainage when tides block outflow and to dispose of rain water when volume is too heavy for gravity-flow to clear.

Four of the five pumps are 75,000 gpm. units, each driven by a 325 hp. Fairbanks-Morse diesel. Although on stand-by duty, engines can be started and at work in

one minute's time. Failure of this operation can have but one result—floods.

Naturally, dust protection is a "must". All four diesels are equipped with an AAF Type "OC-H" filter at the air intake. This low cost unit-type, washable filter is ideal for "hurricane service" because of its low resistance to air flow, high cleaning efficiency and large dust-holding capacity.

Dust protection can spell the difference between keeping your engines "in the pink" or "in the red". There's the one filter in AAF's complete line that can do your job at a reasonable cost. If it's dust —state your problem and we'll supply the right answer.

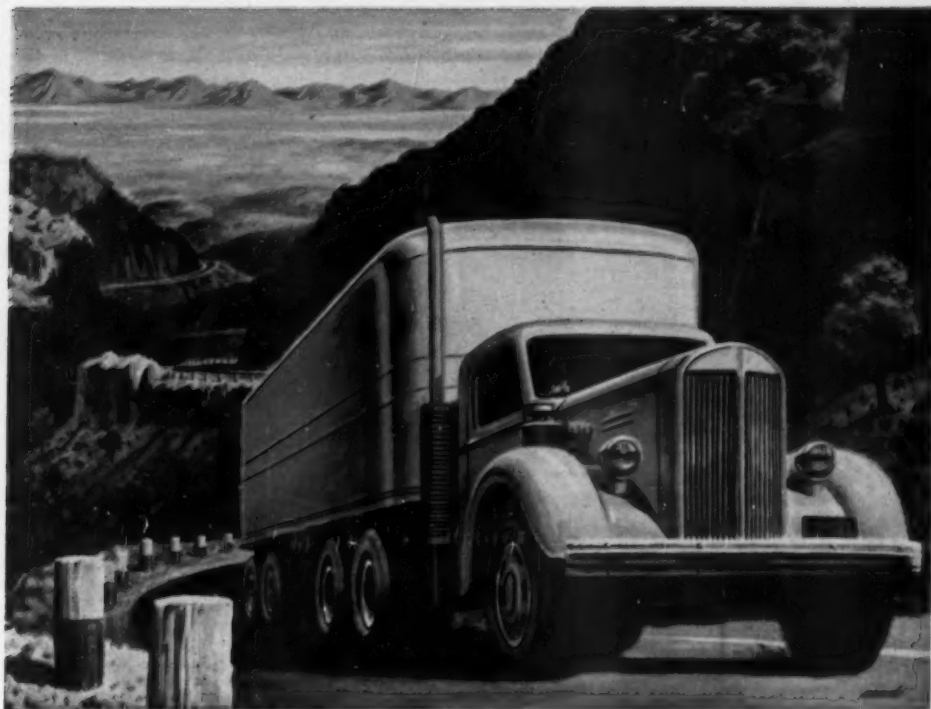
Today's Best Buy is Better Air!



American Air Filter
COMPANY, INC.

408 Central Avenue, Louisville 8, Kentucky

Darling Brothers, Ltd., Montreal, P. Q.



tough jobs—EVERYWHERE **demand AMERICAN BOSCH performance**

Hauling heavy loads through broiling desert heat and cold mountain passes is all in the day's work for many over-the-road truckers. Dependable, fast schedules are their stock in trade—and that's why you'll find American Bosch products on the job.

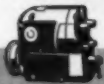
Many of the Diesel engines used to furnish the tremendous lugging power in these operations are equipped with American Bosch fuel injection systems—pumps, governors and nozzles that deliver the fuel . . . precisely timed and accurately metered to each engine cylinder, pressure atomized for maximum combustion efficiency.

Other American Bosch products, too, contribute

to performance and safety—heavy duty generators and voltage regulators that furnish the required current for batteries and the numerous electrical accessories—electric windshield wipers that provide constant clear vision for drivers regardless of engine speed or load.

Over 40 years of pioneering design, precision manufacture and thoroughgoing service have built the American Bosch reputation for dependability in the toughest going. Continuous research, development and field engineering assure that this reputation will grow even stronger through the years. American Bosch Corporation, Springfield 7, Mass.

AMERICAN BOSCH



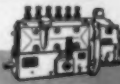
Top quality Magneto for over 40 years.



High-performance, trouble-free Generators and Regulators.



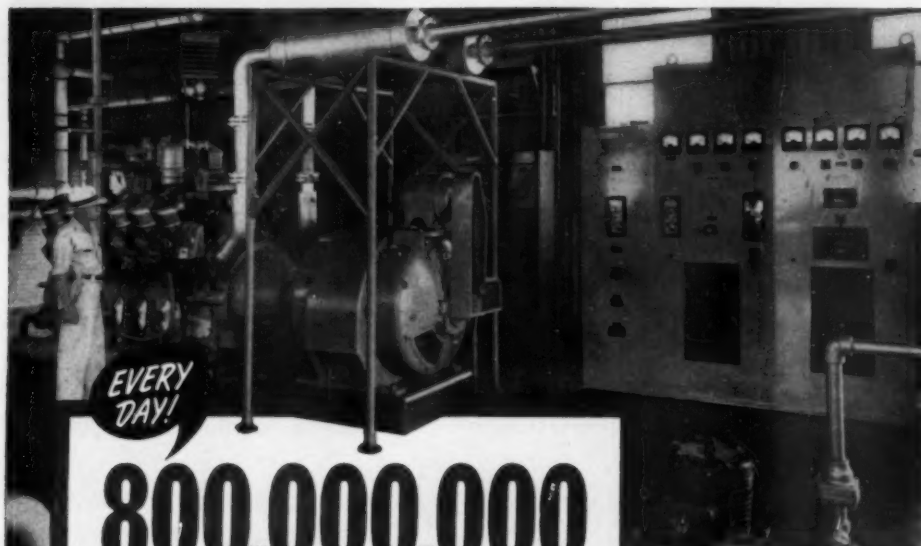
Continuous-action, all-elastic Windshield Wipers.



Standard of excellence in Diesel Fuel Injection Equipment.



Precision components for aircraft engines.



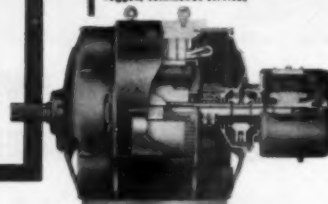
800,000,000

CU. FT. OF GAS

SAFEGUARDED BY

Standby **POWER UNITS**

Below is a cutaway view of an E-M Synchronous Generator. A heavy duty type, it features a direct-connected exciter. Designed for top efficiency in rugged, continuous service.



E-M Synchronous Generators ready for emergency action at Texas Eastern gas pipe line stations

● With a tremendous daily gas pipe line volume such as this, *protection equipment* can be just as vital as production equipment. Planning ahead to meet any power emergency, Texas Eastern Transmission Corporation has equipped its compressor stations with standby power units.

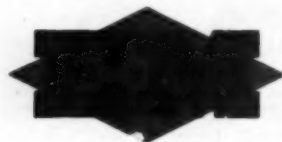
Essential part of the unit at the Lebanon, Ohio reciprocating station (above) is a 375 kva, 1200 rpm E-M Synchronous Generator.

If high line power should fail at this station, the E-M Generator immediately supplies emergency power to operate the station. When main power is restored, the Generator synchronizes with the central

power line and a relay drops off the standby unit. It is ready again for instant service whenever needed.

How much is this emergency power worth to you? In most cases, cost of the standby unit is only a fraction of the losses which might be caused by a major system breakdown. E-M's widely-used High-Speed Synchronous Generators, ranging from 1.25 to 5000 kva, are designed and built for consistent, dependable service under a variety of operating conditions.

Call your nearest E-M sales engineer for his recommendation on your requirements. Or write and ask the factory for E-M Synchronizer No. 35.

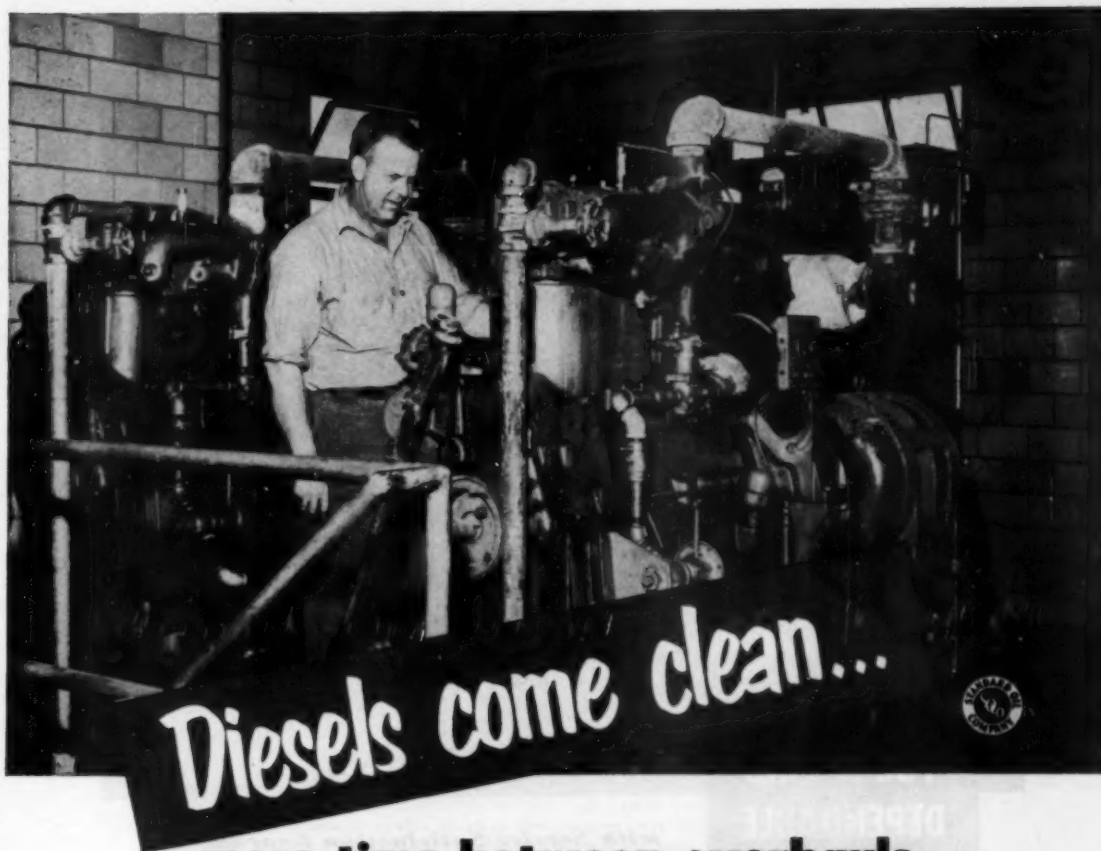


ELECTRIC MACHINERY MFG. COMPANY

Minneapolis 13, Minnesota

Specialists in
DEPENDABLE POWER APPARATUS

3106-TFA-2109



more time between overhauls

These two 50-HP diesel engines, serving in a midwest sewage disposal plant and utilizing sewage gas as fuel, had to be shut down on an average of every three months to have stuck rings and valves freed and cranks cleaned of sludge.

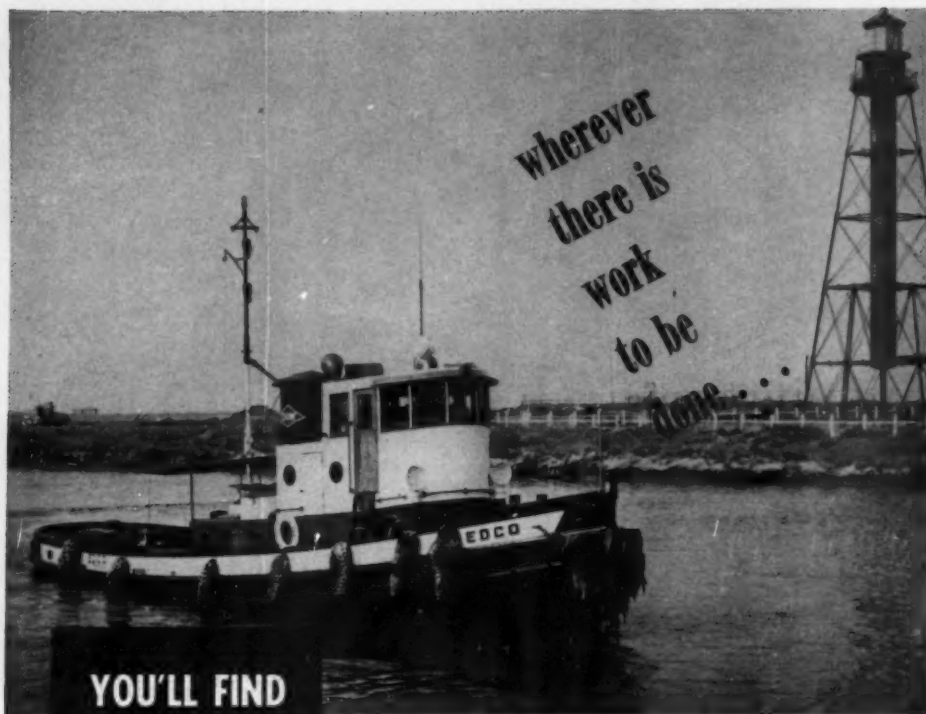
Then a Standard Oil lubrication specialist recommended STANDARD HD Oil. Sticking of rings and valves has been eliminated. The engines have stayed clean, operating for as long as two years between overhauls. Operators report a 20% reduction of oil consumption.

This plant's success in lowering maintenance costs is typical of the results gained by STANDARD HD users wherever operating loads are severe and/or fuel quality is adverse. To apply the benefits of STANDARD HD Oil in your own diesel operation, call for the services of your local Standard Oil lubrication specialist. Contact your Standard Oil Company office or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.



(Indiana)

STANDARD OIL COMPANY



**YOU'LL FIND
DEPENDABLE
GM DIESELS
ON THE JOB...**

***with Service Satisfaction Guaranteed
by Stewart & Stevenson Services***

This tug . . . the Edco . . . is now repowered by a GM model 12001-B heavy duty twin 6 Diesel Engine developing 260 to 330 horsepower.

And like all of the many other boats powered by GM Diesel Engines from Stewart & Stevenson Services, it is performing vital jobs for important industry along the Texas Gulf Coast.

It will pay you to get the complete story of how GM Diesel Engines have set a new standard for performance, dependability and over-all economy. It will pay you to find out why so many marine operators have standardized on GM Diesels. And when you deal with Stewart & Stevenson Services, you have the added satisfaction of knowing that your engines are guaranteed to do the job they are recommended to do. Contact your nearest Stewart & Stevenson representative today for complete details on your marine power requirements.

STEWART & STEVENSON SERVICES, Inc.

Main Office and Plant: 4316 Harrisburg Blvd., Houston 11, Texas. Phone WOodcrest 9691

Branches: Corpus Christi, Dallas, Lubbock, McAllen, Wichita Falls.

Representatives: San Antonio, Waco, Longview, Brownsville, Breckenridge.

Distributors of: General Motors Diesel Engines, Continental Red Seal Engines, Chrysler Industrial and Marine Engines, Chicago Pneumatic Engines, Potter Diesel Engines, Gardner-Denver Pumps.

Fabricators of: Electric Power Units, Electrical Control Equipment, Portable Pumping Units, Truck Bodies, Hurricane Stalk Shredders.



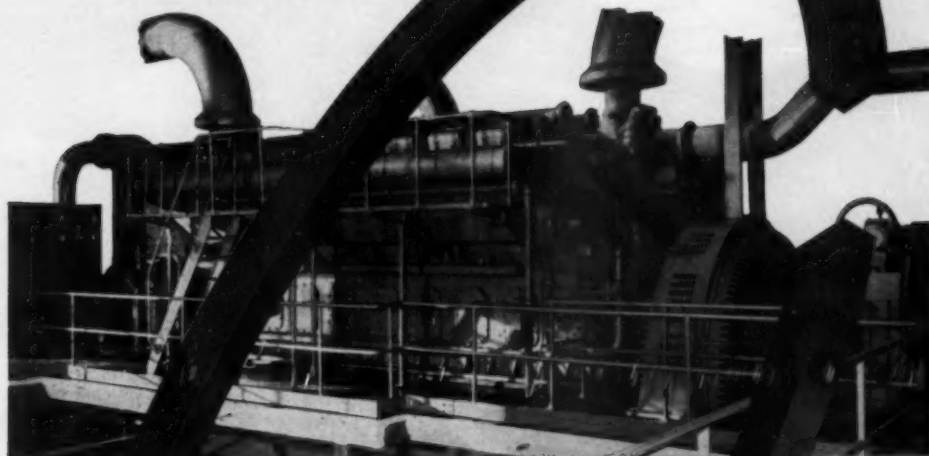
**PARTS...
SERVICE**



**Anytime
Anywhere**

THE NATION'S LARGEST DISTRIBUTORS OF GM DIESEL ENGINES

**KOPPERS Porous Chrome
Rings keep maintenance
costs to a minimum
in diesel power plant**



Koppers K-Spun Piston Rings, produced by centrifugal casting process, are 100% stronger . . . four times more resistant to combustion shock than ordinary rings! They will not break in installation or for the life of the engine.

Koppers Porous Chrome* Rings have a porous chrome surface that holds and distributes oil during break-in, quickly wears down to perfectly seated solid chrome that prevents grit and other particles from embedding in the ring surface where they can scratch cylinder walls. Porous Chrome Rings last up to four times as long as other rings, reduce cylinder wear 50% or more.

That's why engineers everywhere are reporting amazing savings in equipment and maintenance costs through the use of Koppers Rings. Remember . . . we make rings for any equipment that uses piston rings.

EVAN DER HORST PROCESS

If you have a piston ring problem, why not get the right answer from us? Write, wire or phone Koppers Co., Inc., Piston Ring Dept., 1681 Hamburg St., Baltimore 3, Md.

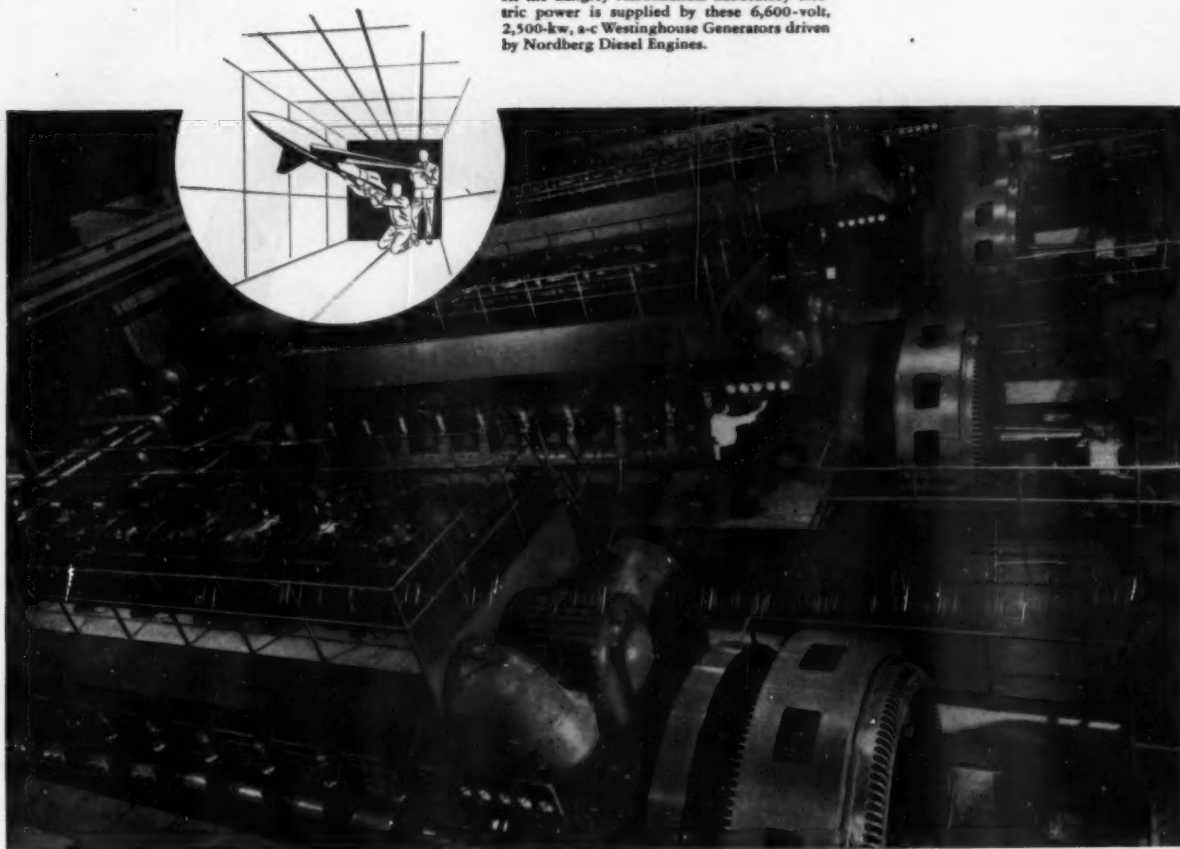


KOPPERS AMERICAN HAMMERED **PISTON RINGS**

SPECIFY: Fast's Couplings . . . Koppers Piston Rings
. . . both famous products of the Koppers Co., Inc.

ONLY KOPPERS CAN FURNISH K-SPUN OR POROUS CHROME!

At the Langley Aeronautical Laboratory electric power is supplied by these 6,600-volt, 2,500-kw, a-c Westinghouse Generators driven by Nordberg Diesel Engines.



Electric Power... Made to Order

Many contributions to America's air supremacy have been developed in the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics. Supplementary power at peak loads to operate the large wind tunnels and stand-by power to serve the general research needs is supplied by the engine-generator units shown above.

The specifications for this power plant were wide in scope in 1940—today the specifications for new mammoth wind tunnels are considerably greater. Originally this plant was designed to ease the Laboratory's peak-load demands on the utility system. The engine-generator units had to be capable of starting and picking up large and intermittent loads on little or no notice and be suitable for frequent starting and stopping during any 24-hour period. Also, it was necessary for the plant to carry vital operating loads of the adjacent air base and feed power back into the local public utility system in any emergency.

Westinghouse engineers went to work on the generator problem... produced four 6,600-volt, 2,500-kw, a-c generators to handle the job. These Westinghouse Generators have been serving the Langley Aeronautical Laboratory for the past ten years.

Consult your nearby Westinghouse Office for the services of a Power Apparatus Specialist. He will help you select and apply the right generator for your job. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-10358

YOU CAN BE SURE... OF THE

Westinghouse

AC GENERATORS

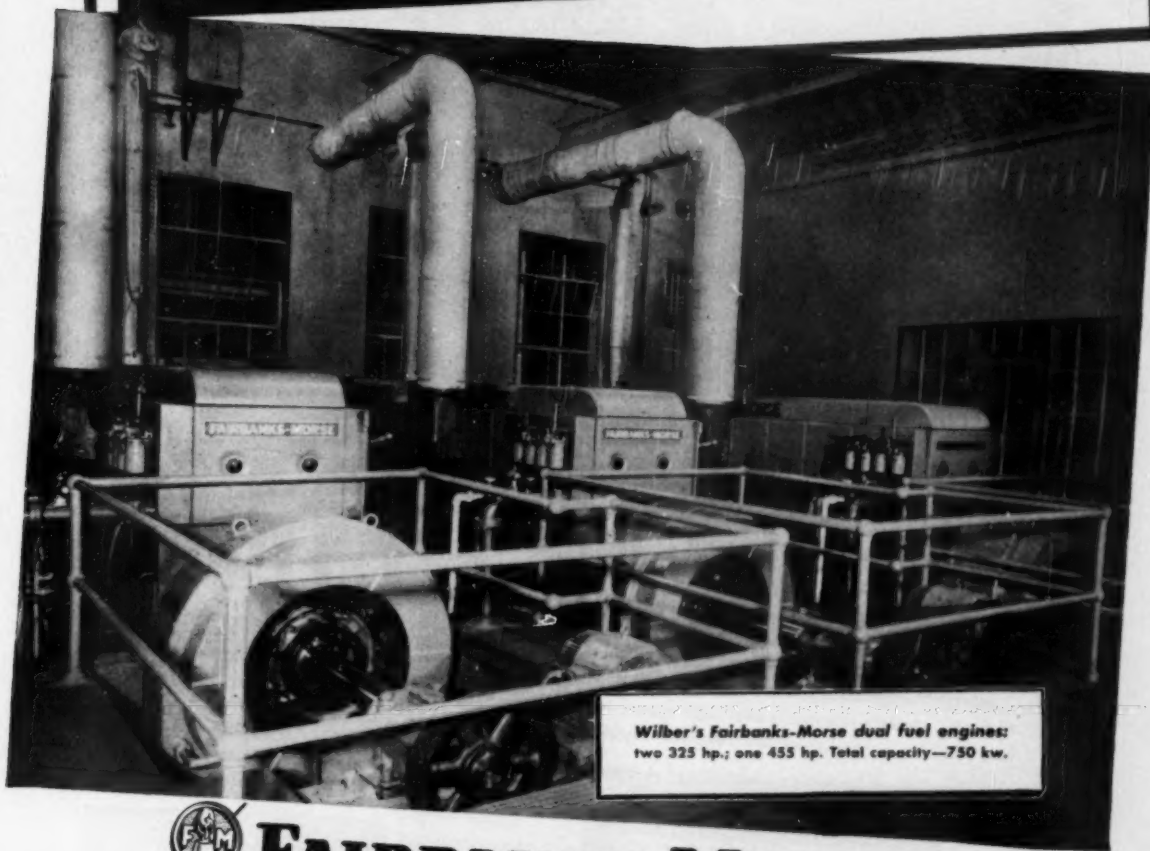


**Wilber's Saving \$8000
Yearly with
FAIRBANKS-MORSE
Dual Fuel Power!**

The 1455 people of Wilber, Nebraska, are enjoying a total savings of over \$8000.00 a year, since the town started producing its own power in the first 100% dual fuel power plant in the state.

Burning economical natural gas, two Fairbanks-Morse Model 31 dual fuel engines give the Wilber plant ample capacity with plenty of standby power for emergency.

Wilber is one of many dual fuel plants—Fairbanks-Morse equipped—that mark a new avenue towards lower power costs for your community or your business. Fairbanks, Morse & Co., Chicago 5, Ill.



Wilber's Fairbanks-Morse dual fuel engines:
two 325 hp.; one 455 hp. Total capacity—750 kw.

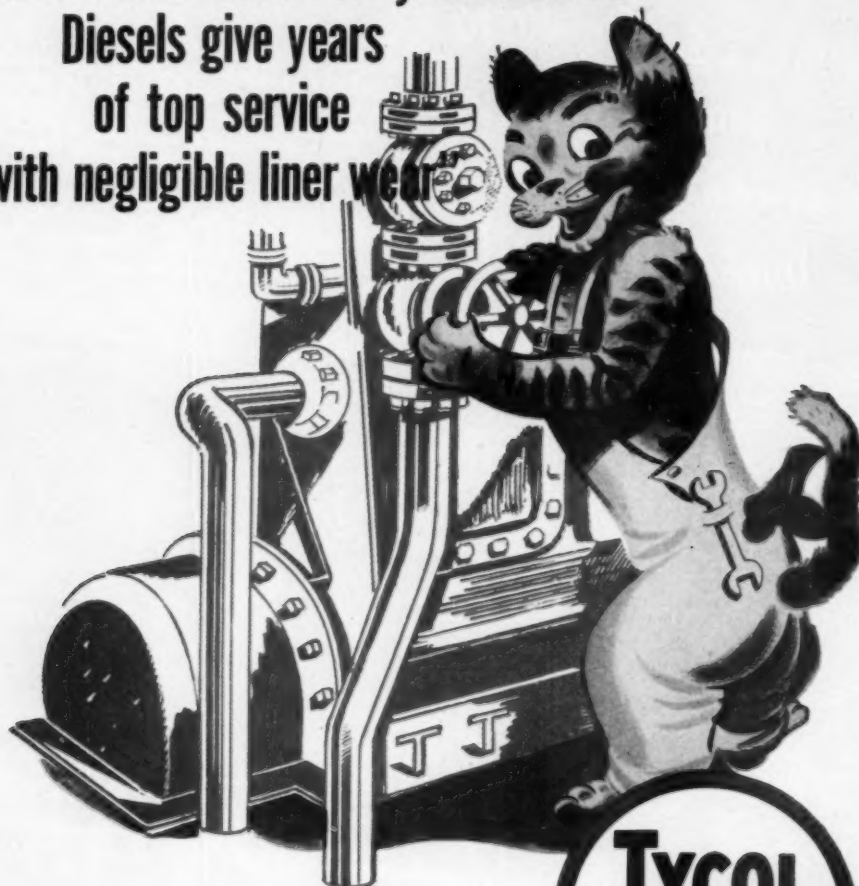


FAIRBANKS-MORSE,

a name worth remembering

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • ELECTRICAL MACHINERY
PUMPS • SCALES • RAIL CARS • MAGNETOS • FARM MACHINERY

**"Tycol Adelbus cuts costly overhauls...
Diesels give years
of top service
with negligible liner wear"**



Exactly! Tycol Adelbus Diesel Oils are fortified with selected additives that provide a tough "film of protection," and help to eliminate sludge and varnish. They have excellent detergent-dispersive characteristics and amazing resistance to heat... assure the piston seal that means FULL power and economy... and provide exceptional resistance to oxidation.

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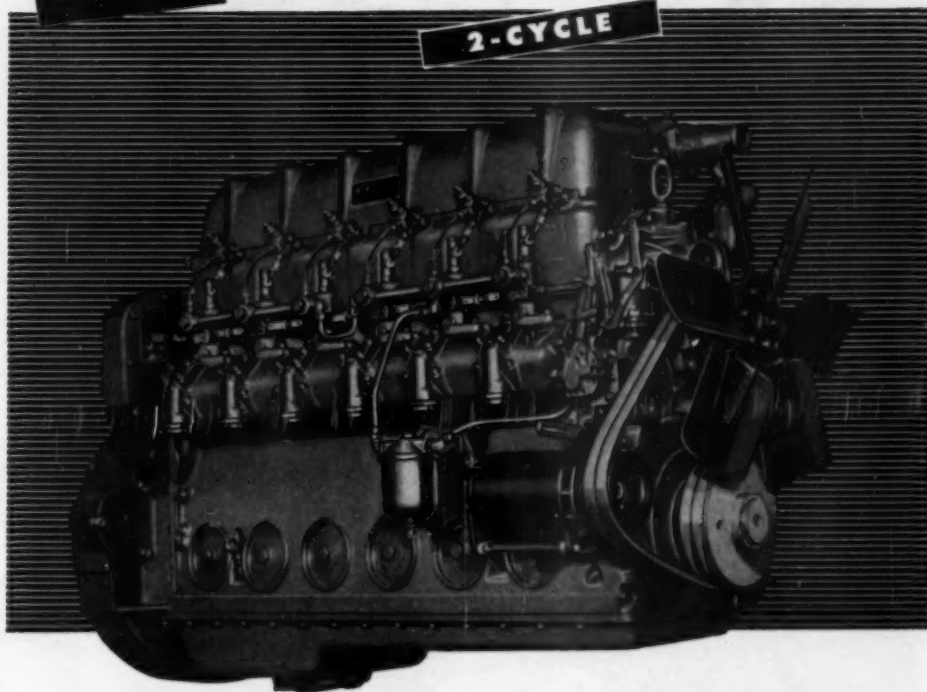
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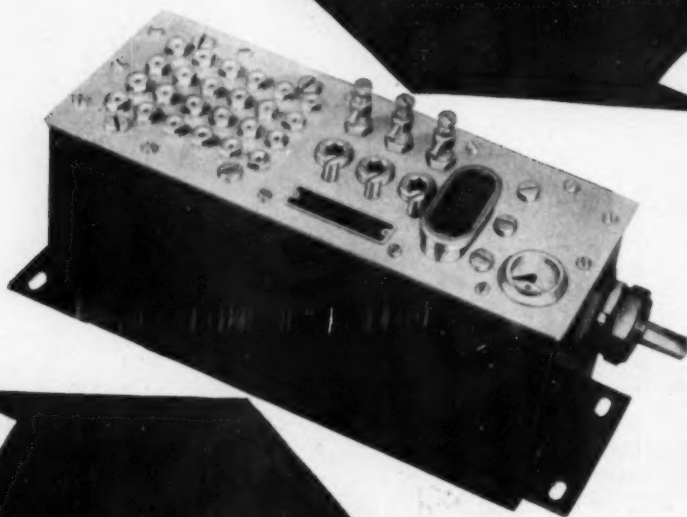
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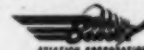
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Creston Transfer Company, Grand Rapids, Michigan, haul uncrated furniture to the East Coast and southern cities. Creston began using Shell Rotella Oil nearly 4 years ago to correct a serious overhaul problem due to short valve life in their trailer truck engines. Shell Rotella Oil has increased valve life from 8,000 miles to better than 40,000 miles and greatly reduced all-around maintenance costs. Creston Transfer is now expanding with hauls to nearly every state. The proved lower maintenance through using Shell Rotella Oil is a basic part of Creston's expansion planning.



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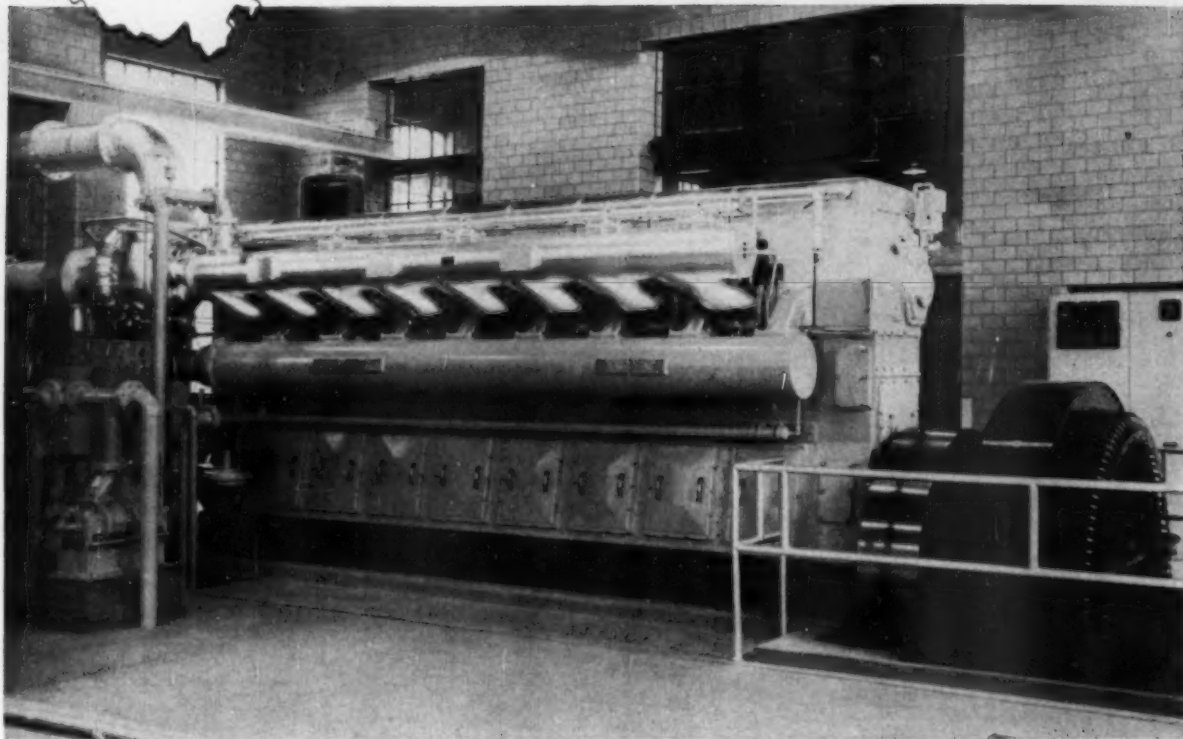
If you want to cut lubricant inventories to the bone . . . to realize savings in time, labor and materials . . . mail this coupon for "The Three-Barrel Plan." It's a practical booklet that shows how this revolutionary lubrication program can cut your maintenance costs.



TIME BETWEEN OVERHAULS!



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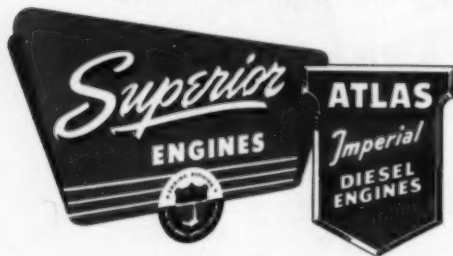


The facts about the performance of Superior Diesels are easy to get because there are so many of them in service throughout the U.S.A.—and throughout South America. Somewhere nearby there's an industrial plant or municipal power project, or a public building using dependable Superior or Atlas Diesels.

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ENGINE DIVISION

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keep engines Clean

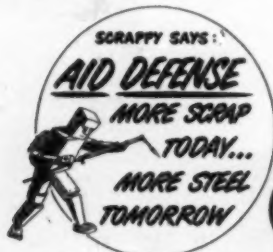
For lubrication counsel, see your nearest Supplier of Sinclair Products or write direct to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.



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Your business *must* have available
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forces and our allies well armed . . . to
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coming more severe every day.

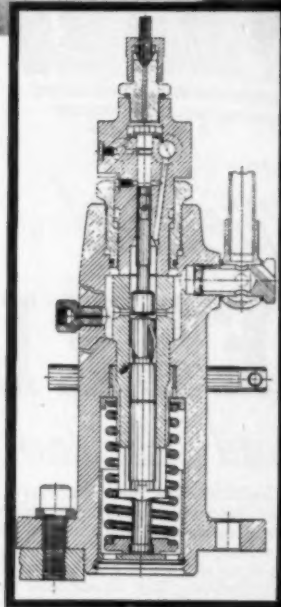
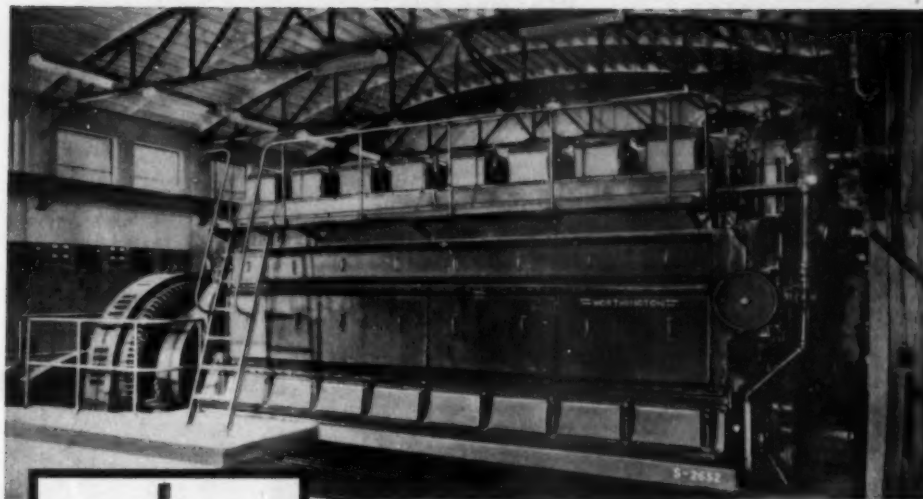
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many other critical materials. Also, scrap helps
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This advertisement is a contribution, in the national interest, by

Rex T. Hadmear

Editor—DIESEL PROGRESS



Cross-section, Worthington patented dual plunger fuel pump.

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Right now this Worthington Diesel—one of three 1760 hp units owned by the city of Tarboro, N. C.—is operating on oil.

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Write for Bulletin S-500-B 31 C, Worthington Pump and Machinery Corporation, Engine Division, Buffalo, New York.

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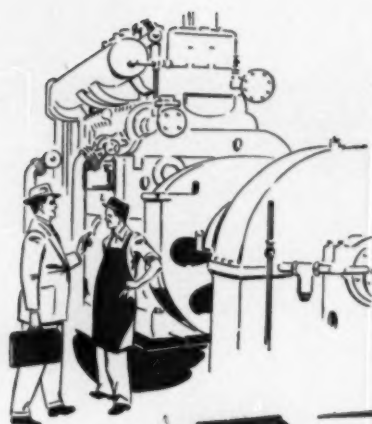
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CONTENTS FOR NOVEMBER, 1951

Dieselizing Hawaiian Sugar	33
Designing Diesels to Fit The Job	38
Diesels and Pineapples	40
Lanai Power House	44
First Diesel Tractor in Hawaii	46
Ubiquitous Diesels in Hawaii	47
Isleway's Diesel Tugs	48
Diesel Progress in The Hawaiian Sugar Industry	51
Hawaiian News	53
Young Brothers' Diesel Tug Fleet	55
B & C Trucking	56
Diesels Here and There in Hawaii	57
Transportation	59
Harvesting	60
Wailuku Sugar Plantation Diesels	62
Grand Haven, Michigan Expands Plant	64
What's Going On In England	66

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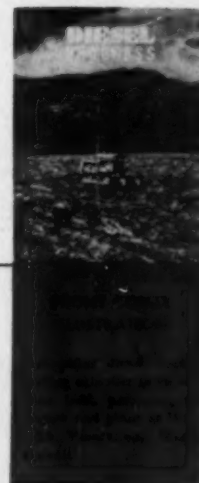
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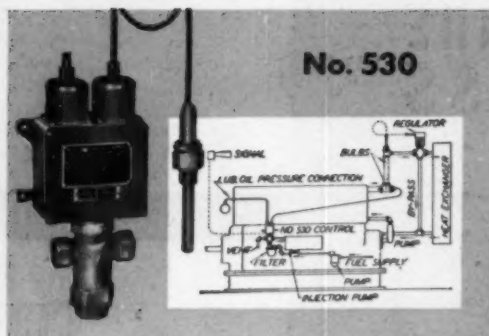
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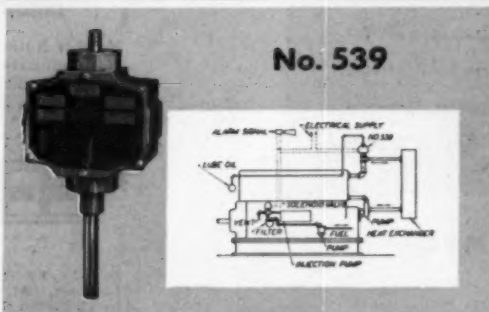
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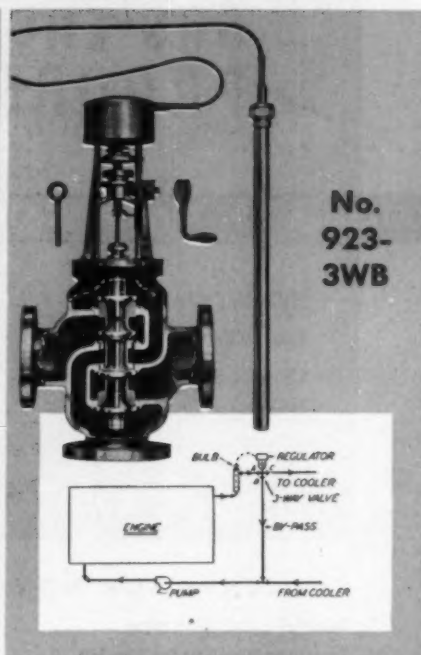




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DIESELIZING HAWAIIAN SUGAR

By ADAM ALBERT SMYSER



BACK in 1937, Hawaii's sugar harvest was about 944,000 tons. Last year it was 960,000. But it took 38,000 workers to do the job in 1937, and only 19,000 last year. Machinery has made the difference, and most of it is diesel driven. Mechanization of Hawaii's plantations started in earnest in the mid-1930's, was interrupted by World War II, spurted after the war, and now is being slowed again by the new defense effort.

From the very first, diesels have been the favorite in Hawaii for all jobs requiring 50 hp. or more—and that includes most of the jobs for which a sugar plantation needs machines. There are at least two reasons: (1) Fuel economy is one of the most important. Diesel fuel costs less and gives more miles per gallon. In addition, diesel fuel for vehicles not used on territorial roads enjoys a substantial tax advantage that makes it even more attractive. (2) Diesels have generally greater lugging power.

An official of the Hawaiian Sugar Planters Association says diesels also rate a special preference in rainy areas like the Hamakua coast of the so-called Big Island of Hawaii. Ignition type engines have a tendency to short out if the water gets to them and that can lay them up for several hours.

The intense mechanization is a big reason why Hawaii has been able to retain its lead of all 79 countries producing beet or cane sugar in wages paid, output per man hour and sugar per acre. But the mechanization program is nowhere near finished or stabilized. The only two really standard pieces of equipment in the cane fields are the tractor and truck. All other machines represent adaptations to suit the needs of particular plantations and these vary widely from plantation to plantation as do the growing processes.

Irrigated plantations use one type, non-irrigated

another, and even within the two major divisions there are numerous variations. Diesel pumps help keep the \$44,000,000 irrigation system rolling. And diesel tractors help harrow, plough, plant, spray, cut and harvest the cane. An important function is fertilizing, carried out with specially adapted tractors. Hawaiian planters figure that without the 100,000 tons of fertilizer they use each year, sugar tonnage would be only a fraction of what it is now.

Hawaii's 220,000 cane acres supply about $\frac{1}{4}$ of the United States' cane and beet sugar requirements, and about $\frac{1}{37}$ of the world supply. The crop they produced was worth \$123,900,000 in 1950, and dieselization helped make it possible to pay an average daily wage of \$8.30 on a year-round basis to non-supervisory employees, one of the best agricultural wages in the world.

Working through Hawaii's sugar fields is tough

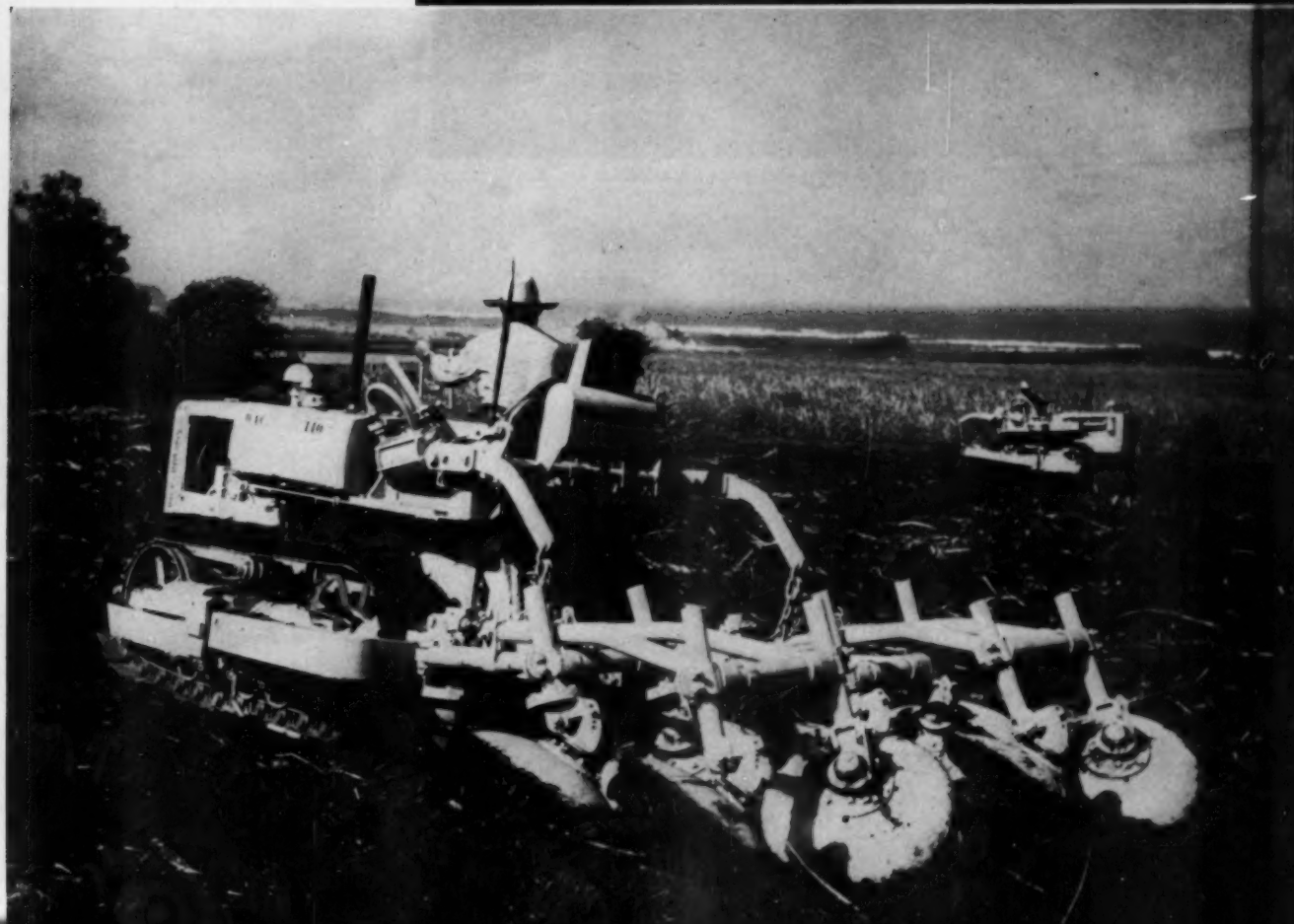
An International TD 18 provides one of the latest type planting machines. This uses pre-cut cane. It was developed by Stubenberg Co. in Honolulu.

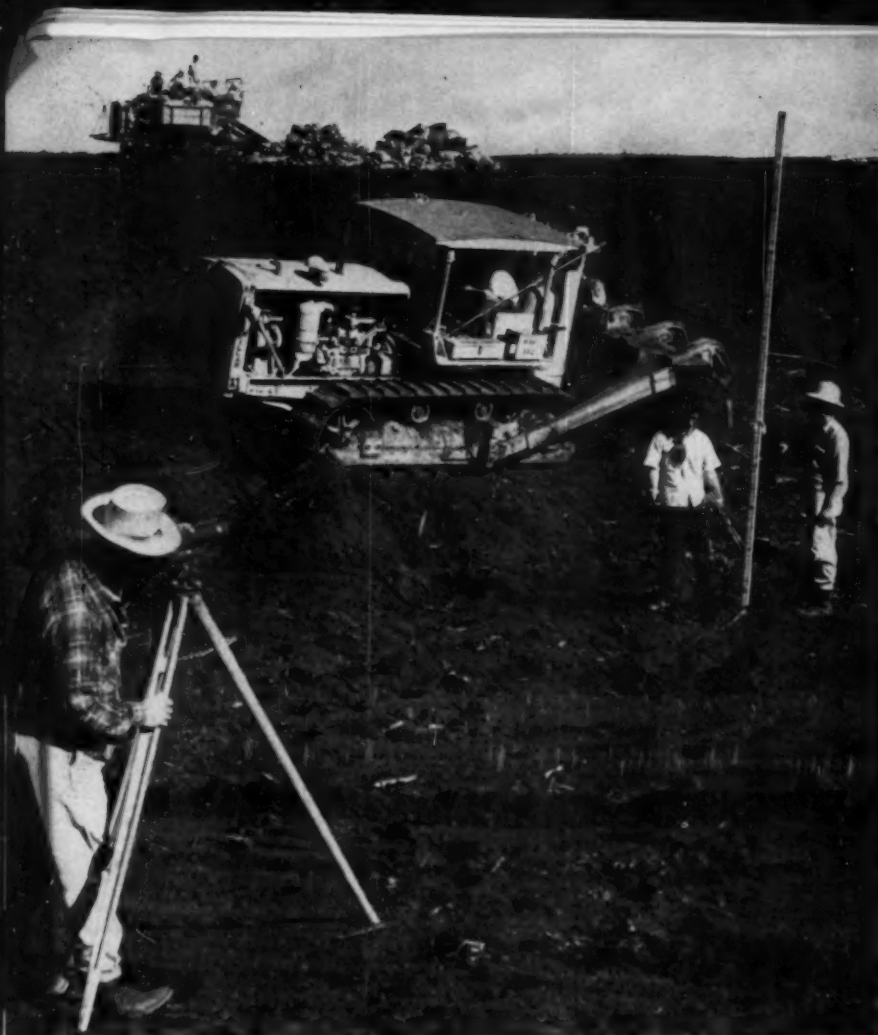


business. Rugged hillsides, rain of well over 100 inches a year in some areas, irrigation conditions must be met. Hawaii's heavy, twisted, matted cane can't be tackled by the light machinery used in areas like Louisiana. Louisiana has a one year crop. Hawaii cane is allowed to grow from 18 to 24 months before harvesting. The result is that cane stalks may be 24-ft. long, heavily matted, and the weight of the cane stalks to be harvested in a single acre can run up to 100 tons.

An International TD 14 here is converted into a cane planter for Ewa plantation. Short lengths of cane are cut by the men on the bridges, fed down the chutes and planted. This particular machine also breaks up the subsoil and reshapes the lines crushed by the tractor treads in passing.

At Waialua plantation a line shaper and stubble shaper moves across a field.





A sugar field is cleared and put back into use at Waialua plantation. While surveyors check the irrigation alignments, a Caterpillar D-8 pulls a subsoiler to break up hard ground below the surface. Up on the hill seed cane stalks are piled high for use by the re-planting machinery working on the next field.

A D4 Cat with a subsoil plow attached directly behind.

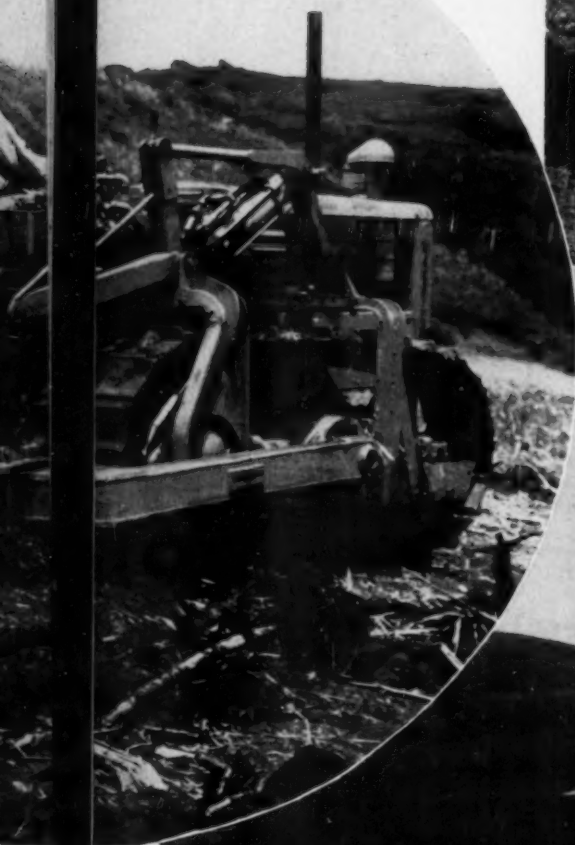


Waialua plantation uses an International TD9 with a diesel fork lift to hoist long stalks of seed cane into the bins of a waiting planting machine.



The sugar cane planting machine used on Hawaiian plantations is a very intelligent device. It plows a furrow, plants 18 to 24-inch seed pieces end to end, places fertilizer in the ground and covers the seed, all in one operation. An International TD-14 is in use here.

A Cat D-8 clears rock with a Fico rock rake developed in Florida. It's a push rake type modified from a cane rake. Some plantations also use an International TD-14 with a rock grab made by Drott Mfg. Co. The grab is a heavier version of a grab Drott originally designed for rubbish clearance. Stubenberg Co. in Hawaii requested the modification.



DESIGNING DIESELS TO FIT THE JOB

WHEN a farmer on the U. S. mainland orders a piece of diesel equipment, likely as not he orders a standard make and gets it in jig time. It's different in Hawaii. Hawaii has two big kinds of mass production agriculture as the backbone of its economy—sugar and pineapple. These are uncommon crops on the mainland. Hawaii's growing conditions are uncommon too, with two year growing cycles for sugar. It follows, as it well might seem to, that many of Hawaii's farm machines are uncommon. Trucks and tractors are about the only standard model diesel equipment in use in Hawaii sugar and pineapple fields.

That trend has been helped in the heavy truck line by Kenworth and Le Tourneau's development of models especially designed for Hawaii's sugar fields. Kenworth has long dominated this field but Le Tourneau and others are now making their bid with bigger capacity hauling trucks. But for the rest of the equipment, it usually is up to the Hawaii dealer to help sell it by providing the adaptations his customers need.

Two firms that specialize in this are A. F. Stubenberg Ltd. of Honolulu which handles International diesels and Theo H. Davies & Co. Ltd., also of Honolulu which handles the Caterpillar line. They build equipment in their shops to suit the needs of Hawaii planters. The designs spring from many sources—the plantations around the island, the Hawaiian Sugar Planters Association, the Pineapple Research Institute. Many, too, have popped

from the fertile brain of A. F. Stubenberg, founder of the company that bears his name and still its president and guiding genius. Sometimes a design is the collective work of a number of interested parties. There are 28 sugar plantations and 14 pineapple plantations in Hawaii, and everyone of them uses diesels extensively.

Were it not for the adaptations of diesel equipment, Hawaii's conversion to machine agriculture would have been much slower. As it is, however, S. T. Hoyt, engineer for the sugar plantations of Castel & Cooke Co., estimates that practically all field jobs requiring more than 50 hp. are done now by diesels. L. A. McDonnell, official of American Factors Ltd., makes a similar estimate. He says it can safely be said that 80% of all heavy equipment is diesel. One example of how thorough the dieselization has been can be found in fuel consumption statistics. In 1942, the sale of diesel fuel in the territory totalled 6,688,310 gallons. Last year, it came to 26,709,000 gallons. Not all of this represents fuel consumed in diesel engines, of course. A portion went for heating and some is used in weed killing. But it shows a trend that's unmistakable.

For a time after World War II, Hawaii sugar plantations were spending \$7,000,000 a year for new machinery—much of it diesel. In their conversion work, both the Stubenberg and Davies Companies used standard tractors of convenient sizes as a base. Some adjustments are simple—a rake, a plow, a

By A. A. SMYSER



Another elaborate conversion of an International tractor is shown here. This is a version of the conveyor belt machine used in picking pineapples developed for California Packing Corp. in Hawaii. The power and locomotion unit is an International TD 18. Hawaiian Pineapple Co. uses a different version in which the belt apparatus is moved along by the loading truck. The truck pulls out and the machine must remain stationary until another moves under. Trucks pull up alongside the CPC unit to get their loads, while the unit moves on its own tractor power.

A. F. Stubenberg, president of one of Hawaii's big diesel conversion shops, stands by a fertilizer built from an International TD 6 tractor. The axles have been extended, tires installed and fertilizer bins built over the two wheels. It bears little resemblance to the standard TD 6 the shop started to work on.

Here's the new "gyro tiller" developed by the Stubenberg Co., rigged for its first pass across a pineapple field. Note the heavy crushing drums just behind the front tires. This whole front unit is detached after the first pass, and replaced by a sweeping unit. The chains in front are unhooked to detach it, a power drive connection is unhooked, and the iron beam at the sides is detached at the mid-point of the tractor.



harrow to be attached, and the parts made interchangeable as often as possible so that a tractor can fill more than one use. But some conversions more than double the original cost of a tractor, and make it practically a new kind of "animal." Fertilizer machines usually are special adaptations with wheels set to the width of the cane furrows and special bins supplied. Cane planters to drop 18 to 24 inch long pieces of seed cane into furrows also require elaborate permanent superstructures. Spray machines are another example. Where possible, a tractor is adapted to perform more than one operation at a time. One recently developed by Stubenberg can perform as many as six operations at once—thus saving five crossings of a field.

Under the direction of Richard Duncan of the HSPA experiment station, a Duncan cane harvester has been built that will cut cane, lift it from the field on an elevator, and eventually (it is hoped) load it right onto a waiting truck. Efforts also are being made to have this machine clear the cane of trash, rocks and soil. These now have to be washed off at the sugar mill in an expensive water cleaning operation that also robs the field of valuable top soil and wastes the mineral wealth of the vegetable trash.

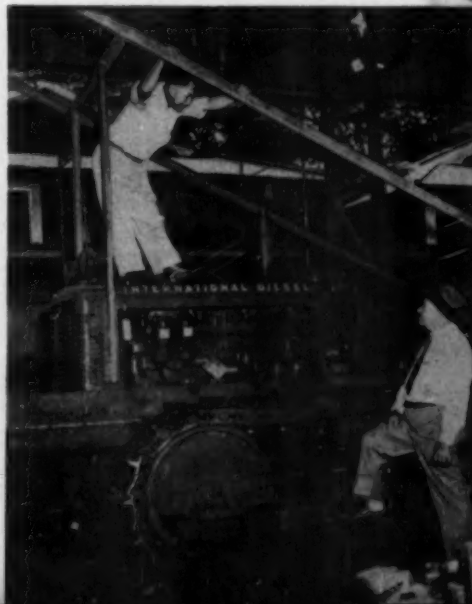
Perhaps the most elaborate conversion so far attempted is a "gyro tiller" that Stubenberg has produced for Libby, McNeill & Libby Pineapple operation. It is so successful that Libby has ordered

nine. California Packing Corp. (Del Monte) has two on order. Pacific Pineapple Co. has ordered one. A unit powered by an International TD 18 crawler tractor of about 95 hp. will do these things: On its first pass over the field it carries a crusher attachment at the front end to demolish old pineapple plants and stumps and prevent future sprouting. This device is then supplanted by a rotary sweeping device. On the second trip across the field this sweeps the crushed plants away from the planting rows to the sides. The second pass then sees all these steps accomplished: (1) the old plants are swept aside; (2) A horizontal "gyro tiller" with teeth mounted on a 54-in. diameter turning table churns through the soil down to depths of 10-in. This supplants both ploughing and harrowing. (3) A soil fumigant is injected into the ground to kill organisms that kill plant roots. (4) Mulch paper is rolled over the planting row into the ground. (This is paper laid over pineapple fields to help hold the moisture and give new plants a better start.) (5) The edges of the mulch paper are weighted down by pushing crushed pineapple plants over it. Experimental efforts are now being made to adapt this same machine to the sugar fields. The sugar unit is to be built about a TD 24, 180 hp. International crawler tractor.

Steps which it is hoped this will perform for sugar are: (1) Tilling the soil with the gyro tiller; (2) Opening planting furrows; (3) Chopping seed cane into proper lengths and planting the cane; (4) Adding fertilizer; (5) Covering the seed. One of Stubenberg's aides says modestly that "this promises to revolutionize field preparation and planting costs."

Is the diesel field in the sugar plantations in danger of reaching saturation point? A. G. Hansen, of Theo H. Davies & Co., isn't worried. "Probably 10 years ago there were people who said that," he says. "Conditions keep changing and new equipment will be required all the time to meet those changes. The present machines eventually will have to be replaced. A diesel theoretically never wears out, but it does become antiquated."

A. F. Stubenberg looks up at Kemji Ahara who is working on the conversion of an International TD 18A into the first Hawaiian sugar cane harvester to have an overhead elevator. The original Duncan cutter has a side cutter and elevator which complicates the problem of moving back and forth across a field.





This aerial view shows one of the Dole Hawaiian Pineapple Co. fields nestled at the foot of one of the rugged mountain ranges in the islands. Note the patterns made from contour planting which is followed in order to combat soil erosion. *Dole photo.*

DIESELS AND PINEAPPLES

By JOHN PINCETICH

HAWAII produces about 80 per cent of the world's supply of pineapple on scientifically-farmed plantations whose heavy mechanical equipment is nearly all dieselized. Pineapple plantations, with their orderly rows of spiky plants and golden fruit, are located on five of the eight main islands of the Hawaiian group. About 68,000 acres of Hawaii's volcanic soil are devoted to raising pineapple, the legendary "king of fruits," and the industry is the island's second largest income producer.

The industry is unusual in the fact that Hawaiian pineapple companies are both farmers and canners. They operate the plantations as well as the canneries, with one exception. There are 10 pineapple companies which operate nine canneries and 14

plantations on the islands of Kauai, Oahu, Molokai, Maui and Lanai. Experimental plantings have begun on a sixth island, Hawaii, known as "The Big Island." Last year these companies produced 24,700,000 cases of pineapple and juice.

The oldest company—Dole Hawaiian Pineapple Co.—this year marks its 50th anniversary while the youngest company has been in business about five years. Pineapple farmers, like their mainland cousins, started out with mule power back in the turn of the century days. From this they progressed to the gasoline engines. Records indicate that plantations began equipping with diesel heavy equipment in the late 1920's and early 1930's, although some diesel equipment was in use before this in small measure. Today, says C. S. Pell of P. S. Pell Co.,

The pattern of rows in pineapple fields, and the roads between them, is illustrated by this photo.



Diesel tractors in Hawaii, as elsewhere, can always be found clearing land for productive uses. Here a D-8 Caterpillar is shown rooting tree stumps on land which will be put into pineapple this year on the Dole Wahiawa plantation on the island of Oahu.



This TD-24 diesel International tractor is equipped with a subsoiling rig.

Ltd., which handles the Fairbanks-Morse line in Hawaii, "the majority of the heavy mechanical equipment on all the plantations is dieselized." In the pineapple industry, like the sugar industry, diesels have played a predominant role in the great increase in mechanization which has taken place in recent years.

The first diesel tractors were used by this plantation more than 20 years ago. They were converted gasoline tractors using Atlas Imperial diesels. In 1933 several Caterpillar diesel conversion engines were bought and installed on 65 hp. Caterpillar Best gasoline tractors. The first Caterpillar RD-8 was purchased in 1936 and according to plantation officials it is still performing satisfactorily after some 50,000 hours on various land preparation operations. On this plantation gasoline tractors had been replaced by diesels by 1940. The plantation's first



This D-8 is shown discing a field at the Dole Wahiawa plantation with one of the island's mountain ranges in the background.



Preparing roads and maintaining them in the pineapple fields requires the use of various diesel powered road equipment. Here is an International road grader at work in a new field. Note the strips of mulch paper, through which the pineapple plants will be planted, in the background.

motor grader, a Caterpillar number 11, was purchased in 1939.

The principal work for diesels on pineapple plantations comes in the early stages of the operation. Preparing land usually begins a number of months before planting. Diesel equipped tractors carrying a variety of rigs plow and harrow the earth until the surface is entirely broken up and the vegetation mixed in with the soil. Plows that bite twelve inches into the ground are followed by multiple-disc harrows back and forth across the fields. Occasionally subsoiling may be practiced, with subsoilers breaking up the earth to a depth of 19 to 20 inches. This increases drainage. Diesels handle all this work.

Visitors to Hawaii are often astonished by the regular uniform pattern displayed by the pineapple



The almost-geometric pattern of pineapple fields is amply shown in this aerial view.

The mulch paper operation from the air. This shows a field before being planted, while in the background can be seen a field of young pineapple plants.



fields. This regularity of pattern helps the plantation employees, by dividing the fields into working units. At the same time it conforms to the requirements of the various plantation machines. Diesel tractors with attachments for road shaping and diesel road graders are used for laying out and maintaining the roads which wind through all pineapple fields.

When a field is ready for planting again the diesel tractor is utilized. Before the new plants are planted strips of mulch paper are laid by machine across the fields, forming the rows. This paper, which is similar in appearance to tar roofing paper, helps prevent the growth of weeds, conserves moisture and fertilizer, and increases soil temperature. It ranges from 24 to 36 inches wide, depending on the plantation. At the Dole Hawaiian Pineapple plantation at Wahiawa on the island of Oahu, for instance, an International diesel is used to carry a three-row paper laying machine which is also fitted with soil fumigating equipment. As the paper unrolls two discs push earth over the edges to hold the strip in place. The paper is marked to show the spots through which slips are to be planted. Men carrying narrow steel trowels come along later,

plunge through the spot marked and thrust a new plant through the hole. About 17,500 new plants are planted to the acre. After the fields are planted most of the heavy work has been finished and diesels are not needed in many of the subsequent operations.

The pineapple plant matures in from 18 to 22 months. Each plant yields one pineapple. Fields produce two to three crops, usually, before they are plowed under and the operation started all over again. Diesel equipment on island plantations varies in size and make. Here, for an example, is what we found on the large—12,000 acre—Dole Wahiawa plantation: one TD-24 International tractor, ten D-8 and RD-8 Caterpillar tractors, two D-6 Caterpillar tractors, five D-4 and RD-4 Caterpillar tractors, one TD-18 International tractor, one TD-14-A International tractor, one TD-6 International tractor, one ADL Cletrac tractor, two number 12 Caterpillar motor graders and an International Trojan grader. Two Fairbanks-Morse Y diesels, quite old, are used by the plantation to power standby water pumps. This is the only stationary diesel equipment on the plantation.



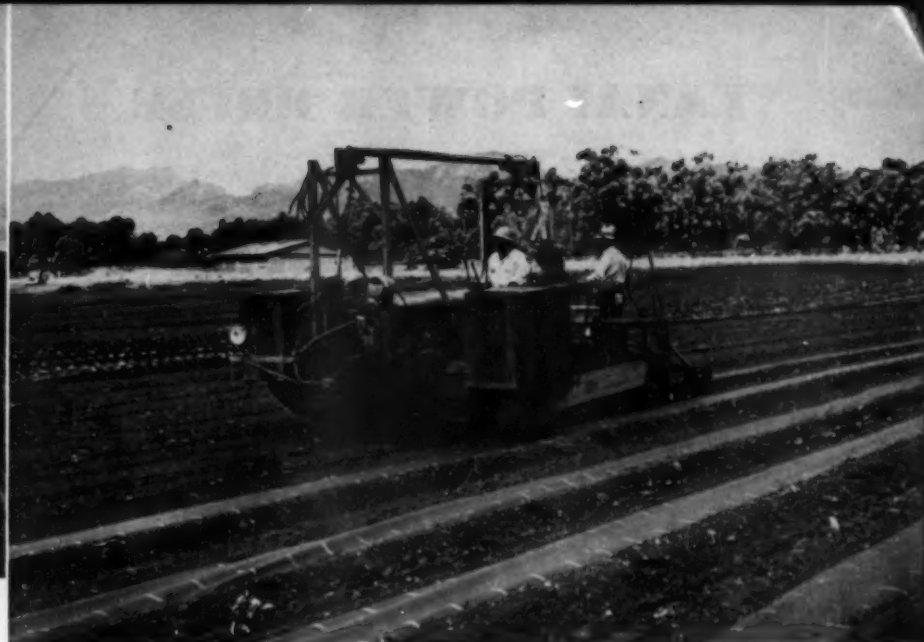
Trucks, fitted with long (up to 55 ft.) booms deliver spray over a wide series of rows of young pineapple plants in one operation. Plants are sprayed with insecticides in order to offset the efforts of various plant pests, such as the mealy bug. This spray rig is run by a D-3400 Caterpillar engine and operates on the Dole Wahiawa plantation.

An Autocar diesel with an NHB 200 Cummins engine is one of the diesels used by Oahu Transport Co., which has taken over many of the Oahu hauling operations given up when Oahu Railway & Land Co. cut down all its railroad operations except those between the Honolulu pineapple canneries and the nearby docks. Here a fork lift loads some ripe pineapple fresh from the field onto an OT truck for delivery to Honolulu.

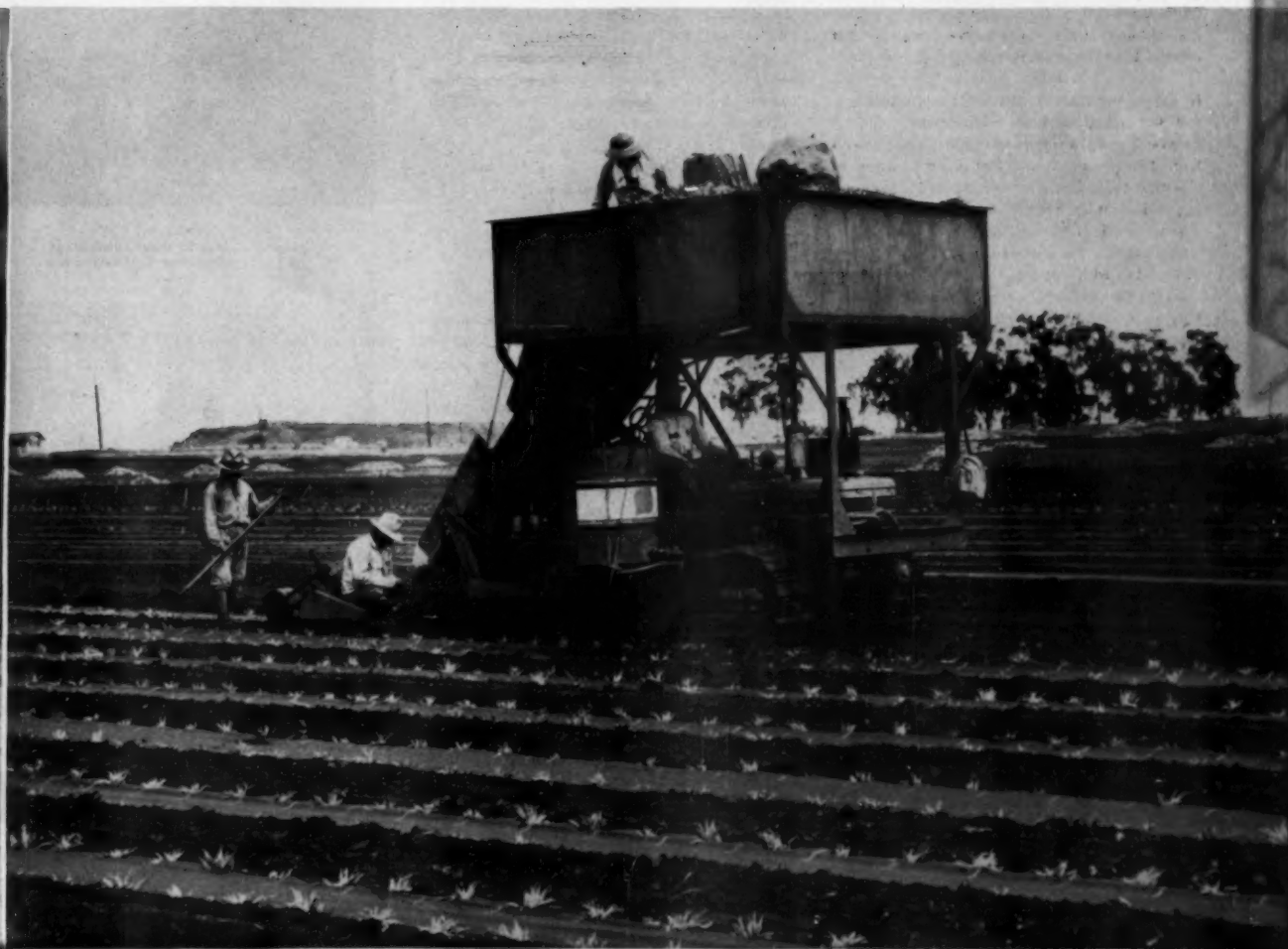




Here is one of the newest uses for a diesel tractor on the Dole Wahiawa plantation. A recently-devised mulch paper laying and planting machine is mounted on this International TD-6 tractor. The man seated on the rear of the machine is planting new plants. Usually this job is done manually. This rig is still in the experimental stage.



This is a single-row mulch paper laying machine mounted on a D-4 Caterpillar. Smaller machines like this are used in fields not suited to the larger machines.



LANAI POWER HOUSE

By JOHN PINCETICH

ON the island of Lanai, home of what is probably the world's largest pineapple plantation, is located one of the finest up-to-date diesel plants in Hawaii—or "anywhere" to take the word of the 10 man crew who run it. Diesels play an important role in both the operation of the plantation and the daily lives of the 3,000 people—mostly plantation employees—of Lanai City, which has been described as "a body of land surrounded by pineapples."

About 60 miles of Pacific Ocean separate Lanai from the island of Oahu, site of the capital city of Honolulu. Lanai is one of a chain of five islands that lie to the southeast of Oahu. It is about 13 miles long, 13 miles wide and has an area of about 140 square miles. A mountain range borders one side with the highest elevation 3,370 feet. It has a rugged coastline with only one man-made harbor. In general appearance it looks more like a patch of New Mexico than one of the Hawaiian Islands. Prior to 1922 the island was used principally for raising cattle, goats and sheep, projects which were unsuccessful. But that year the Dole Hawaiian Pineapple Co. purchased the island in order to add needed acreage for producing pineapple for its cannery in Honolulu. The Lanai story since then has been one of continuing progress. In little more than a quarter century Lanai's great wastes were transformed into a 15,000 acre pineapple plantation and a modern city with every convenience and comfort has been built.

In developing the city, diesels for the utilities system was a logical choice of company engineers because Lanai, like other Hawaiian islands, has a limited water supply. The first power plant, using a Standard diesel, was constructed in 1924, according to incomplete records. Soon after two Busch-Sulzers—one in 1926 and the other a year later—were installed. These were the 300 hp. Type 3-B-100 models with 200 kw. General Electric generators. As the demands from the new town of Lanai City grew, and as the needs of the plantation became greater, more power was needed. In 1936 a Busch-Sulzer 600 hp. 8-DF-17 unit with 400 kw. General Electric generator was installed. These units served the city and plantation until the fall of 1947 when the demand for additional power led to the construction of today's modern plant.

Increased home consumption of electricity as post-war appliances became plentiful, and the develop-

ment of a plantation irrigation system were impelling reasons behind the construction of the larger power plant. Lanai was the first pineapple plantation in the territory to use water for irrigating. Practically all the others depended on tropical rains for plant moisture. Much of Lanai plantation too, is dependent on rainfall, but severe droughts in recent years necessitated the development of a well system, to give nature an assist.

The Lanai City powerhouse is 140 feet long by 62 feet wide, with a brick front and sides of corrugated transite. It sits on the edge of the pineapple fields only three blocks from the center of town, at an elevation of 1,500 feet. With its construction the company purchased and installed a 600 hp. Worthington DD 7 engine with a General Electric 400 kw. generator and two 450 hp. Fairbanks-Morse 32-E-14 engines with 300 kw. generators, these last two from surplus Navy equipment. Transferred into the new plant were one of the original 300 hp. Busch-Sulzers with a 200 kw. generator and the 600 hp. Busch-Sulzer 8-DF-17 with the 400 kw. generator purchased in 1936.

These five units gave Lanai City 2,400 diesel hp. with a total generating capacity of 1600 kw. This installation also gives the plant considerable flexibility in efficiently meeting various load demands. In its last annual report the power department showed an annual peak load of 1,080 kw.; total engine hours of 17,979; total kw. hours of 4,707,300; fuel consumption of 365,950 gallons and an average kw. hours per gallon of fuel of 12.86. Maintenance cost in man hours was \$2,122.75 and in materials, \$3,378.23. The powerhouse presents an unusually clean appearance inside because of the system of underground piping. A tunnel which is located in the center of the building running lengthwise with a pair of branches at midpoint contains all the pipes serving the five engines.

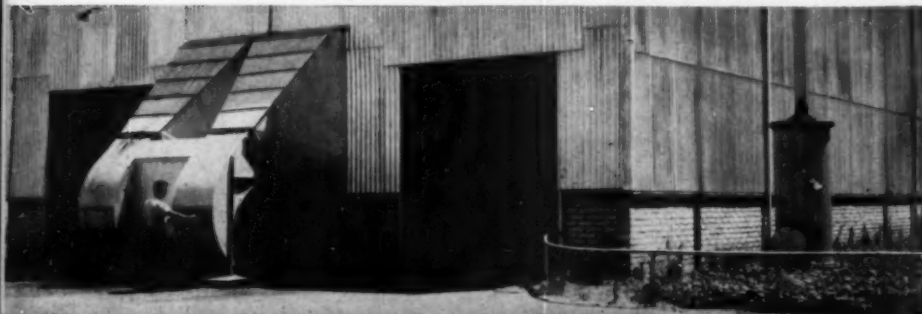
Other up-to-date features of the Lanai plant include a system of filtering all incoming air through a pair of American air filter units; an overhead travelling crane which contributes to the ease of maintenance and overhaul; a home-designed and installed kerosene cleaning plant which "saves" around 475 gallons of kerosene a month, which formerly was thrown away.

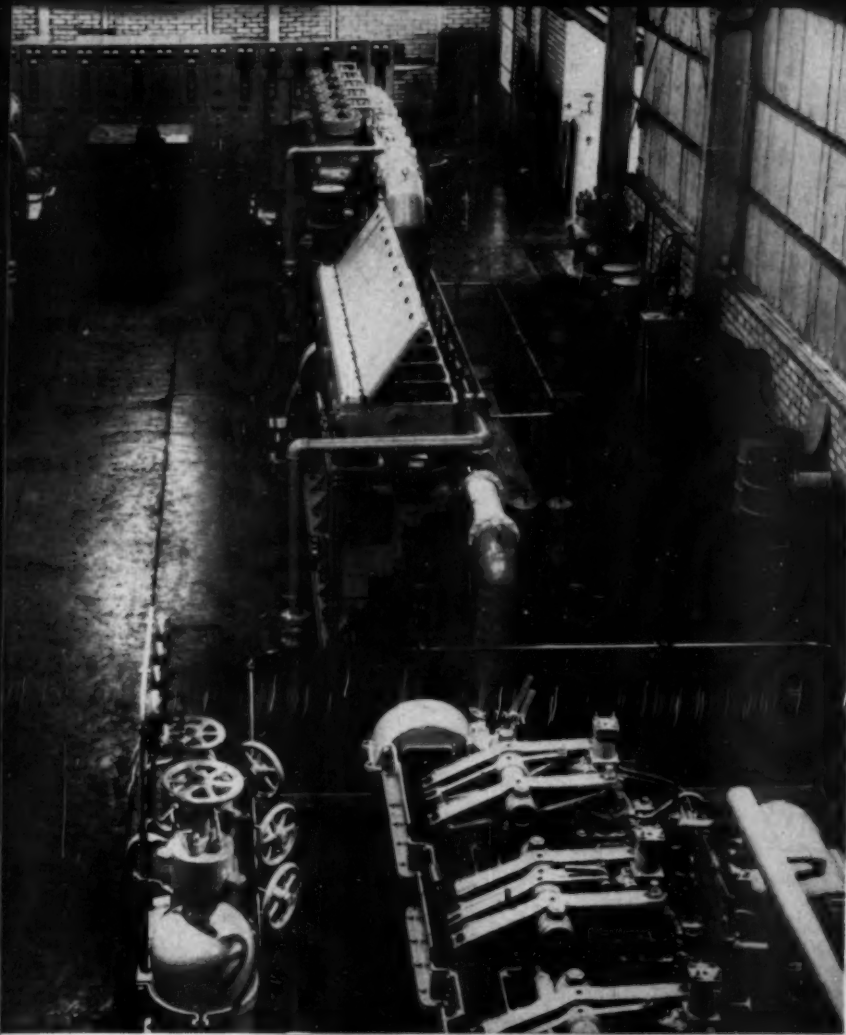
Five circuits serve the city, four to various residential areas and the fifth to the plantation industrial

Rear view of power plant shows two multivane blowers which introduce outside air into plant through American air filter unit of continuous self-cleaning type. This type of ventilation is necessary at Lanai City because of dusty condition encountered during plowing operations in nearby pineapple fields. With this system power house building is under positive air pressure at all times. To the right one of the Maxim silencers.



Richard C. North, superintendent of the Lanai power house is shown at his desk.





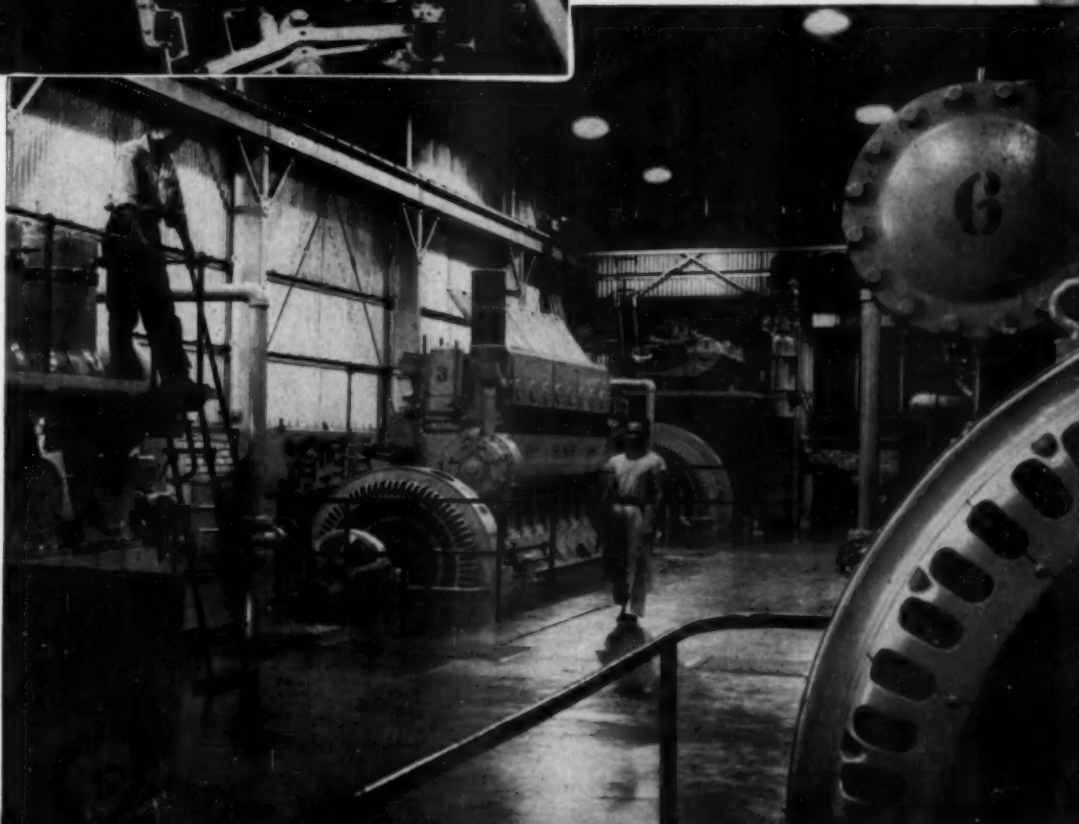
This is an overall view of the interior of the Lanai power plant. At the far end is General Electric power panel. Next comes pair of Fairbanks-Morse 32-E-14 engines. At left center is the Worthington DD-7, plant's newest engine; at right center Busch-Sulzer 8-DF-17. Part of fifth and oldest engine in plant, the Busch-Sulzer 3-B-100, which has given 85,000 hours of service.

This interior view shows the plant's Busch-Sulzer 8-DF-17. Last year this engine ran 5,106 hours and produced 1,640,000 kw.

NOVEMBER 1951

area. These are all 2400 volt primary to 120/240 volt secondary circuits with the exception of that to the industrial area which requires a secondary voltage of 440. A sixth circuit carrying 6,600 volts serves the main reservoir pumps and irrigation wells. Water for irrigation comes from five 1,000 foot wells, located within one to five miles of the city and pumped by electric pumps. The main source of city water is in Maunalei gulch where a 300 foot tunnel has been bored into the mountain side on a 30 degree slope. Two Worthington duplex type KPS-2 electrical power pumps with a capacity of 316 gallons a minute each draw up this water. Maunalei gulch is 7 miles from the city and plantation proper, on the other side of the mountain range. Water must be lifted nearly 1,000 feet and through a 3,000 foot tunnel before it begins its gravity ride into the main reservoir.

Fuel oil comes to the island by Standard Oil Company tankers which pump it into company storage tanks at Kaunapau harbor seven miles away. It is from this harbor that pineapples are loaded on barges for the trip to the Honolulu cannery behind the company's two ocean-going diesel-powered tugs. Fuel oil is stored at the powerhouse in a 25,000 gallon tank from where it is centrifuged, purified and transferred into a 5,000 gallon daily use tank. Average oil consumption runs around 800 gallons a day. Richard C. "Dick" North is superintendent of the Lanai powerhouse, a position he has held for more than a year. Working under him is a staff of 10 men. In his spare time Mr. North runs a diesel engine school for residents of the city. It is part of the Territory of Hawaii's adult education program and more than 30 students meet two times a week in the evening to study diesel engineering. One corner of the powerhouse is the classroom, and two old tractor diesels are used in instruction.



FIRST DIESEL IN HAWAII

**The First Diesel Tractor in Hawaii Is Going
Onto Twenty Years Old This Fall**

By A. A. SMYSER

THE first diesel tractor in Hawaii is going to be 20 years old soon, and it's still going strong. In fact, Thomas A. (Tom) Guild, Oahu Sugar Company's veteran garage superintendent, says fondly, "it's just as good as those that come out today." Tom obviously is partial to his Caterpillar tractor, Serial No. 1-C-3, the third diesel ever built by Caterpillar. Records of the Theo. H. Davies Co. show it was sold on December 28, 1931, and the Davies Company says it was the first complete diesel they, or anyone else sold in the territory. About 1930 the Atlas people had brought in some conversion units for Caterpillar gas tractors and a few of these were used by the Hawaiian Pineapple Co. until Caterpillar came along with its own conversions and full diesels.

Oahu Sugar Co. first used it for heavy ploughing, then other heavy duty work, and about a year ago

converted it for use as a cane planter. Tom Guild says this isn't as tough work as ploughing, but that doesn't mean that he regards 1-C-3 any less highly than the 74 other diesel tractors, 14 cranes, and 170 trucks that he and 49 mechanics keep in tune for the big sugar company. 1-C-3 now has logged more than 80,000 hours of work, and Tom says it will keep going "as long as we can keep getting parts—10 years at least."

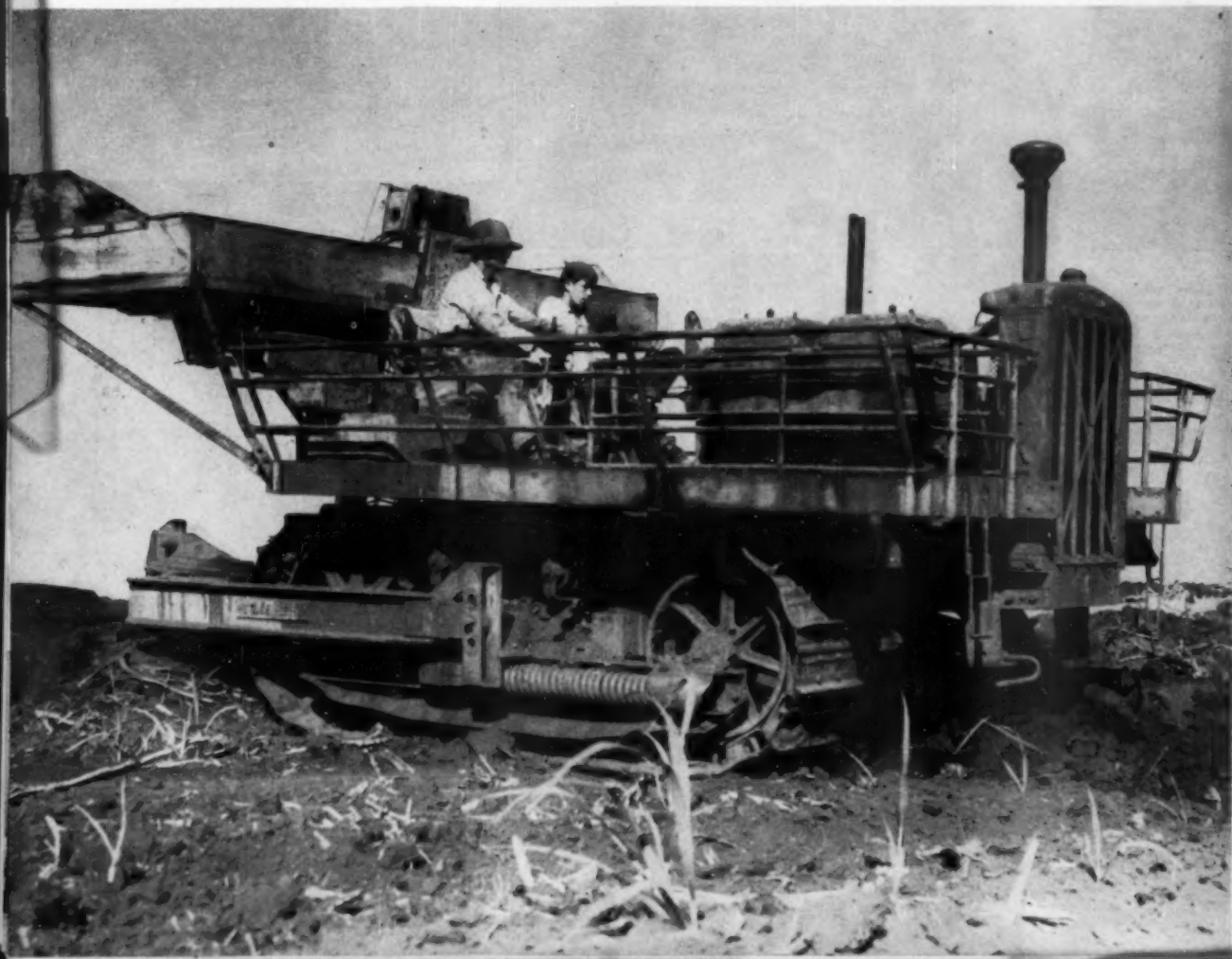
The Caterpillar Company sent a man along to help Tom get familiar with the first diesel, a 4 cylinder, 60 hp. model. He spent a week on the scene. Since then, Tom has nursed it and he says he had "very good results right from the start." He had the "regular troubles" such as a cracked liner, piston ring troubles, and some difficulties with engine overloading but nothing serious. Although the Caterpillar company recommended sending fuel in-

jectors back to the factory for overhaul, Tom decided that was "too much nuisance" and took care of it himself. To be on the safe side, he was very particular at all times to keep his fuel clean.

The only difference he sees between 1-C-3 and modern diesels is that the modern ones hit high speeds 1-C-3 can't reach. But because of 1-C-3, Tom says he has had a fondness for diesels right along. "I liked them right from the start," he says. "There are quite a number of makes and I find them all good. There are certain faults in each kind, but once corrected you have smooth sailing."

Besides the 75 tractors, Tom takes care of 30 diesel trucks—Diamond T, Kenworth and FWD's. The company has 14 Northwest and P & H cranes, with Cat, Hercules and Murphy engines. It also has 140 gas trucks used for one to five ton loads.

46



UBIQUITOUS DIESELS IN HAWAII



Hickam Field. "Caterpillar" diesel engine powering Parsons trench digger.



"Caterpillar" diesel D7 tractor and LeTourneau bulldozer building a road through fern forest on the slopes of Mauna Kea.



"Caterpillar" No. 11 diesel Auto Patrol building scenic drive and park at the Waikiki Beach. Diamond Head in the background.

A Tournapull construction work unit outside the plant of the Honolulu distributor, Hawaiian Equipment Co., Buda 300 hp. diesel.



ISLEWAY'S DIESEL TUGS

By JOHN PINCETICH

WHEN the C-2 freighter *Andrea F. Luckenbach* ran fast aground off the Hawaiian island of Kauai this spring it had aboard a vast variety of military cargo destined for the Korean battle zone. It was important to remove as much as possible, in a hurry. Diesels, in an unusual way, provided the answer. One of the several rescue tugs that sped to the *Luckenbach's* side was Isleway's, Ltd. diesel-powered *Ono*. The *Ono* put aboard power cables then dropped anchor close by. For several days the *Ono's* diesel engines supplied electric power to the disabled ship which made it possible to operate nearly all of the *Luckenbach's* winches. Cargo was moved over the side to waiting barges. The *Ono* played the role of a "floating powerhouse" until portable generators could be rigged aboard the freighter to take over the task. The *Ono* remained on the scene about 45 days, assisting in what proved to be a futile attempt to free the freighter from the reef.

This is just one of the many missions undertaken by the *Ono*, and sistership *Ahi*, which take them far from their prosaic, but picturesque, primary job of towing pineapple barges from the Island of Lanai to Honolulu. Isleway's, Ltd. is a wholly-owned subsidiary of the Dole Hawaiian Pineapple Co. which operates the world's largest fruit cannery

in Honolulu, on the Island of Oahu. The company grows about half its fruit on its Lanai island plantation, 60 miles away. The sister ships tow bargeloads of this fruit to the cannery. They average about 200 trips a year—between them—across the Molokai channel, known as one of the Pacific's rougher stretches of water.

Each barge when fully loaded carries about 1,200 tons of fresh pineapple in large bins. The two tugs are usually busiest with their pineapple hauling between June and September, when the major part of the pineapple crop is harvested. A turnaround tow between Honolulu and Lanai can be made in 14 hours when necessary.

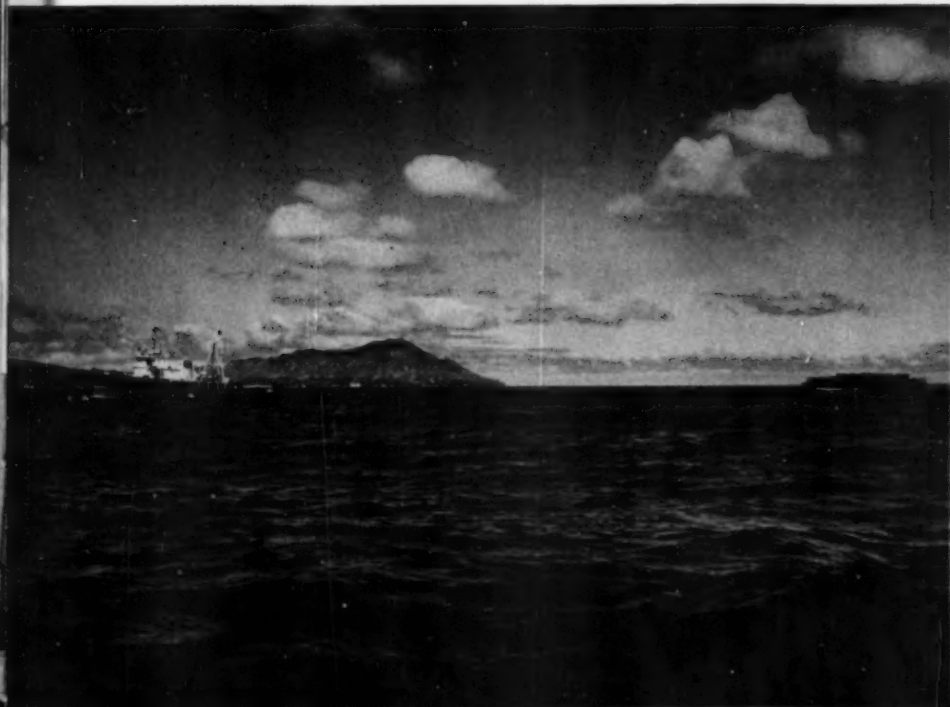
In the line of non-pineapple duty the *Ono* and *Ahi* have participated in a number of interesting and unusual sea-going jobs. One reason for this is that they are two of the largest and best-equipped ocean-going tugs in this part of the Pacific. In 1947 the *Ono* towed three surplus unmanned navy destroyers from Honolulu to San Francisco. Despite bad weather the job was done in 21 days at an average speed of 4.2 knots and a consumption of 39,606 gallons of diesel fuel. Both ships have on other occasions brought disabled freighters into Honolulu harbor for repairs.



Here is an overall aerial view showing the *Ono* approaching Honolulu Harbor with a pineapple barge with historic landmark Diamond Head in the background. Waikiki beach in immediate background.

48

Here is the *Ono* approaching Honolulu Harbor with a pineapple barge with historic landmark Diamond Head in the background. Waikiki beach in immediate background.



showing
unloading
participate
in the

the *Ono* supplying power to the grounded
to the barge alongside. Other ships, including
in the attempt to free the freighter are shown
background.

The *Ono* and *Ahi* were built in 1945 for the navy as rescue tugs, or ATA's by the Levingston Shipbuilding Company of Orange, Texas. Isleway's purchased the pair in 1946 before they were put into commission by the navy. They underwent some alteration, primarily the installation of comfortable accommodations with forced ventilation throughout the ships for the 19 officers and men who man each vessel. The tugs are named after Hawaiian fish. Here are the vital statistics, identical for both vessels: Length 143 ft. 3 in. overall and 134 ft. 6 in. between perpendiculars. Beam moulded 33 ft. with depth, amidship, 17 ft. 2 in. and a 15 ft. draft. Gross tonnage is 516 tons.

Each tug is powered by two 12-cylinder model 12-278A General Motors two-cycle diesel engines rated at 925 bhp. These are connected to Allis Chalmers 560 volt, 1,080 ampere dc. generators which supply power to a pair of 765 hp. Allis Chalmers motors. A single 9 ft. 9 in. diameter by 7 ft. 4 in. pitch propeller is driven by this power plant through a Farrel-Birmingham reduction gear. Two General Motors, Model 6-71, 60 kilowatt

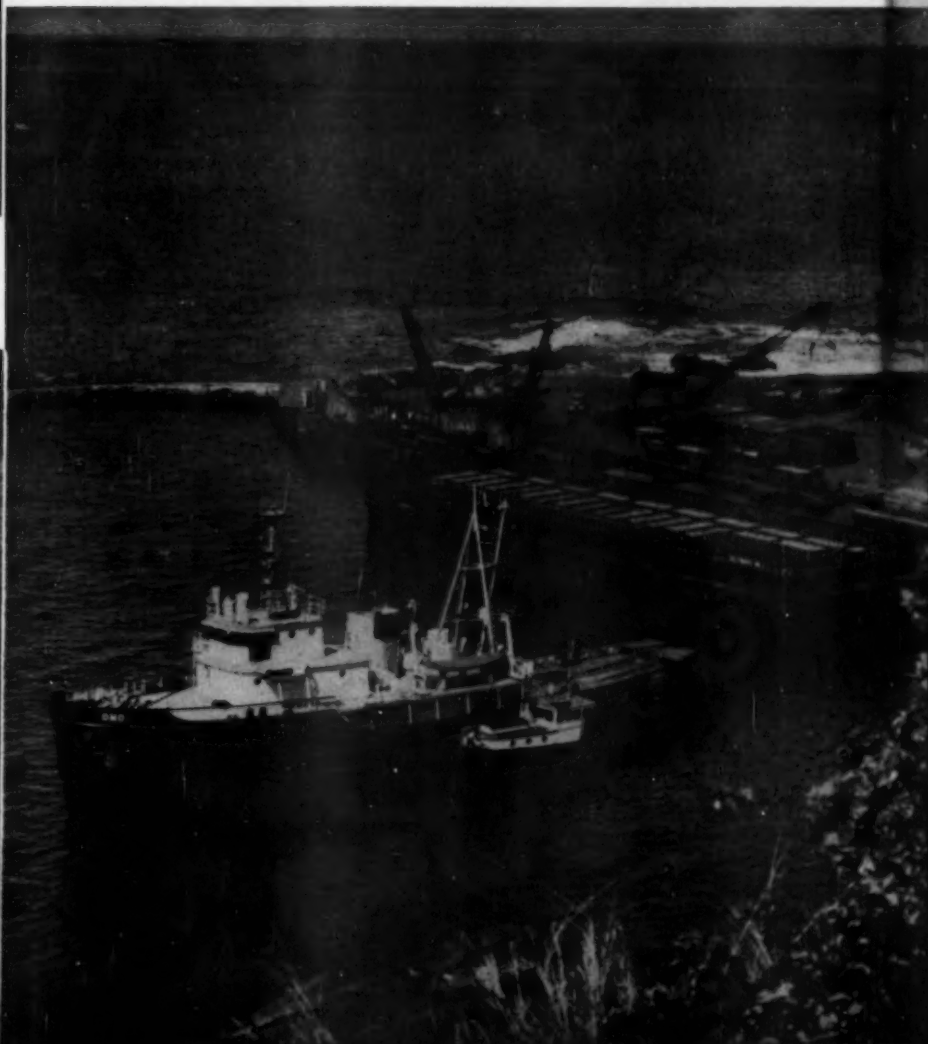
generating sets provide auxiliary power. Two 24 kilowatt, 120 volt generators are connected to the shaft of the main generators for excitation.

Average fuel consumption of the tugs is about 111 gallons of fuel oil an hour, including auxiliaries, at full speed which is 15 knots. The tugs have a fuel capacity of 59,000 gallons with a cruising range of 530 hours at full power, or 700 hours at $\frac{3}{4}$ speed. For towing each tug is equipped with a double drum Almon Johnson towing winch, connected to a 50 hp. 120 volt, 360 ampere, motor.

One drum has 1,800 feet of $1\frac{1}{4}$ in. and the other 1,800 ft. of 2 in. steel galvanized improved plow steel towing hawsers. These double-drum installations were the first of their type to be used by Pacific-operating tugs. The vessels are also fitted with special heavy lift boom and gear capable of handling 25 tons, which increases their versatility. R. M. Botley is president and general manager of Isleway's, Ltd., and B. H. Brown is operating superintendent. The *Ono* is captained by Robert K. Nakea and the *Ahi* by Lenore K. Fuller.

Here is the *Ono* underway with a pineapple barge in tow carrying about 1200 tons of fresh pineapples in large bins.

Loading pineapple at Kaunapali Harbor on the island of Lanai is shown here. Standing by for the 60-mile tow to Honolulu is the Isleway's Ltd. tug *Ono*.





▲ This model of Kenworth 552 uses the heavy FABCO type of conveyor unloading body. Cane is carried out of end of body by endless chains power driven from end. These 552's are mounted on 15:00 x 24 12 ply low pressure tires for maximum flotation and traction in the wet fields close to Hilo. Engine is Cummins HB-600 diesel.



LeTourneau sugar cane hauler showing system of unloading by means of link chain bed.



DIESEL PROGRESS IN THE HAWAIIAN SUGAR INDUSTRY

By W. W. FLAGG

THE mechanization of the Hawaiian sugar industry has come a long way from the early days when a few stalks of cane were ground between crude flat stones turned by a water buffalo hitched to a swing pole. As the industry grew and became the principal source of business revenue for the Territory the principal technical progress came in the mills, the chemistry of extracting more sugar and in the constant improvement in the varieties of cane for greater yields. It was not until World War II started that the big swing to maximum mechanization of field equipment came about due to the shortage of available manpower.

Perhaps we can use one island as a case book in the progress of diesel usage in the sugar industry. The island of Hawaii, largest of the group and which gives its name to the Territory of Hawaii is situated at the southern end of the chain of principal islands that make up the Hawaiian archipelago. It is a group of islands in which conditions of terrain, soil, and climate not only vary from island to island but on the same island. That is why the big island of Hawaii can so well serve as a testing ground for field equipment for it has steep slopes, deep and shallow soil, and a rainfall that varies from a few inches a year in some spots to an average of around 175 inches a year on the coast plantations nearest Hilo, principal city of the island of Hawaii and its only deep water harbor

Olaa Sugar Co. uses six two cycle GMC 6-71, 200 hp. diesels with a semi-full trailer rig like that shown here. The truck is rated at 90,000 pounds gcw. with a 26 ton payload but has been known to do considerably better. The open sides are to cut down weight. Metal slings across the bottom of the bins make it easy to lift the cane out at the mill in 6-8 ton loads. The crane is powered with a Caterpillar D 8800.

through which the products of the sugar mills must go to mainland markets and through which the supplies of a typical American community must enter to support the economy of the island.

Prior to 1935 practically every stalk of cane in Hawaii was transported from the fields by one of two principal methods, either over narrow gauge plantation railroads that even entered the cane fields at harvest time over temporary portable track, or where rainfall was ample and an abundant source of water available by fluming the cane in bundles down long wooden troughs that followed ground contours and wound their way down to the mills which were usually located at the lowest point on the plantation. To cross the many gullies that make up such rugged terrain as that of the coast line of Hawaii these flumes many times crossed the gullies on high spidery wooden trestles. Maintenance of these flumes was an item of considerable expense. Late in 1935 the first serious attempts at using trucks for the hauling of the harvested cane from the fields to the mills were begun.

Before that time some attempts had been made using conventional trucks of the then popular "ton and a half" range, but these proved entirely inadequate. They lacked the necessary capacity, flotation to get in and out of wet fields, and were not built to take the extremely rough usage that

field hauls put upon them. In 1935 the first trucks built specifically to haul cane were introduced. They were Marmon-Harrington's and Kenworth model 513 units. They were gasoline powered. The trucks were ten-wheelers and with all-wheel drive.

The first of these Kenworth 513's were put into operation at Hutchinson Sugar Plantation at Naelehu on the island of Hawaii. Improvements dictated by field operation followed in rapid order and soon a newer and heavier Kenworth, the model 514, was put into operation at the Kohala Sugar Company, located at the northern tip of the island of Hawaii. These 514 Kenworths marked the start of the use of dieselized trucks in the sugar industry as they were equipped with the Cummins 4 cylinder Model HB-400. From then on the use of truck and field mechanical equipment has grown with rapid strides. Today a very popular cane truck in the Hawaiian Islands is the Kenworth, but in many models for each plantation has its own specifications to meet its conditions of terrain, soil, weather, and methods of loading and unloading both in the field and at the mill. Of all these trucks the overwhelming majority are diesel. To keep step with the bigger trucks newer field machinery was necessary. Before 1935 there were many diesel crawler type tractors in use, but these were just about the only dieselized piece of field equipment. With the use of trucks, the former methods of hand

Typical of the trucks hauling raw sugar from the mills to the docks is this Kenworth 824 powered with Cummins NHB-600 engine. Trailer is specially designed Fruehauf with air operated bottom dump doors and which carries in excess of 20 tons of bulk raw sugar. Some of the trucks pulling semis with bulk sugar use the Cummins NHB-600 engine.

51





Latest model Kenworth 524 dump body type of cane hauling truck. Powered with Cummins HB-600. Truck uses 11:00 x 20 tires. Large dump body is over 20-ft. long and conforms to Territorial laws as to maximum width. Average net load of cane 10 tons.

52

cutting and piling of the cane was not only impossible but also too costly. Shovels or drag lines were converted by the engineers, fitted with longer booms and swinging huge multi-tined clam-shell type cane grabs, these cane loaders were able to load the biggest truck with three or four grabs of cane.

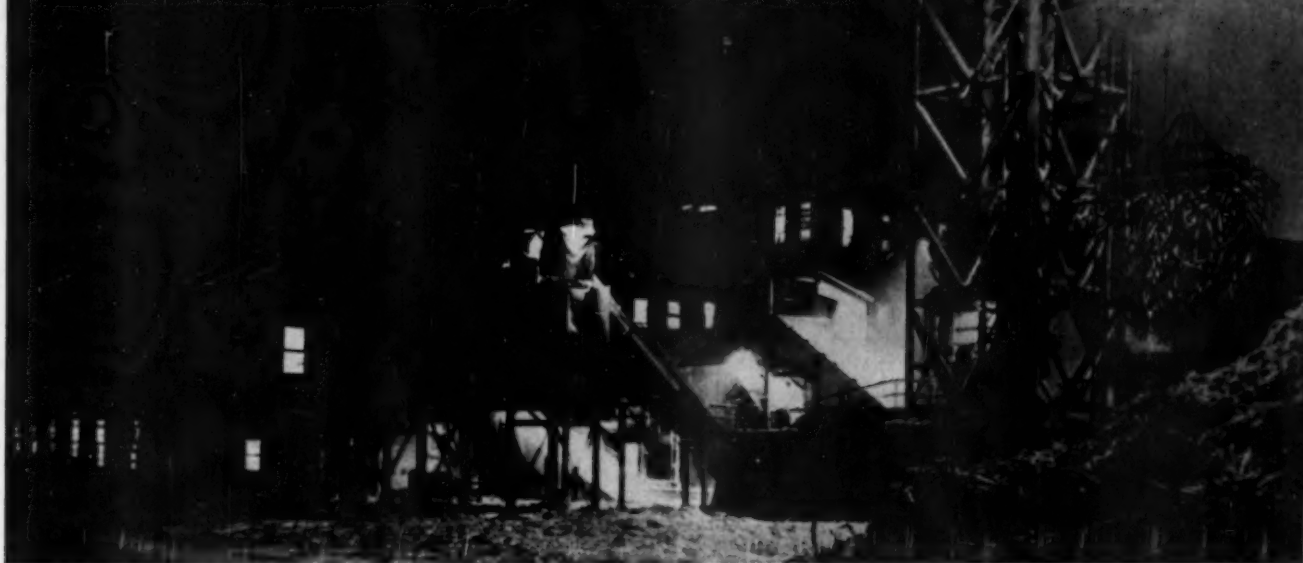
While the early models were in many cases gasoline powered more and more were ordered with diesel engines of the Caterpillar industrial type and in the last few years many of the two-cycle GMC diesels have been installed in the cane loaders. Even the crawler type tractors were used to cut the cane mounting huge push rakes on the front instead of bulldozer blades, they would pile up the cane in long winrows from which the loaders would fill the trucks. On some of the other islands where the terrain was more favorable huge Tournahaulers are used to pull semi-trailers loaded in excess of 30 tons of cane from the fields to the mills. Today the memory of the various early methods of hauling sugar cane from the fields to the mills is rapidly fading. The youngsters of today no longer hear the shrill toot of the narrow gauge trains puffing into the fields over temporary tracks to snake out long lines of dinkey cane cars hand loaded with hand cut cane. The hoarse honk of a diesel's air horn is the sound of a great industry converted to the most modern of transportation methods.

Getting the cane from the field to the mill doesn't complete the need for transportation for the sugar industry. The plantations must have vast stocks of the many and varied supplies to operate. Fertilizers, mill supplies, construction material, and the staples of life such as any American community requires. Here again the diesel truck is the backbone of Hawaii's transportation system. On the island of Hawaii itself, all the sugar produced by its 13 plantations must be hauled from the mills to the docks in Hilo by huge diesel trucks hauling semi-trailers loaded with over 20 tons of bulk raw sugar, and the supplies coming in over the docks must be trucked back to the plantations.

Hawaii is thus an excellent example of how diesel trucks and other dieselized equipment play a vital role in the industrial and economic growth of a community, an island, a Territory, and what someday will be a proud member of the family of states. A nation that rolls on wheels and to which the diesel engine has made a noteworthy contribution.



HAWAIIAN NEWS



Night view of an Hawaiian sugar mill in operation. The mills in Hawaii operate throughout the year, most of them on a 24 hour per day basis. The cane for night operation can be seen piled up in the right foreground of the picture.

Kula Sanatorium, for tuberculosis patients, on the Island of Maui, has an emergency generating plant powered by a 50 kw. Cummins diesel engine. Full automatic controls throw the plant into operation and then out again when the emergency is over.

Tripler General Hospital, the \$40,000,000 Army hospital outside Honolulu, relies on a Cummins Model HIP 600 diesel engine to keep its emergency sewage pumps working if the electrical power supply fails. Tripler is a rest stop for wounded men en route home from Korea. The engine drives a 10-in. sewage pump capable of moving 1,600 gals. a minute. It's located in a pumping pit 16-ft. underground and has a Synchro-Start automatic control equipment to put it into operation when power failure occurs.

Of the 28 sugar plantations, there are only two that don't have at least one Kenworth truck, according to Von Hamm Young, the Hawaiian distributor.

The Honolulu Iron Works in Hawaii represents Allis-Chalmers tractors, General Motors diesel engines (Detroit) and Atlas diesels. It momentarily expects to receive the first HD-20 Allis-Chalmers tractor in the territory, which is described as the largest tractor made by anybody, though the point might be argumentative. It is 175 net engine hp. at the flywheel, using a GM-Detroit 6-110 engine. The HD20 will be used as a demonstrator throughout the territory and it is indicative of the new drive being made to step up the A-C use in Hawaii.

Honolulu Iron do conversion work such as Davies

and Stubenberg—their land clearing rake with an Allis-Chalmers HD 5 tractor is quite popular. Another cane machine they sell is a P & H 455-A cane loader, which is of course a crane, with a GM Detroit 4-71 engine.

Hawaii's sampans use diesel engines in a great many instances and three of the outstanding installations are 250 hp. heavy duty Atlas, 6 cylinder installed in *Darling Dot*. A duplicate installation will be found in the *Uruma* and *Neptune*. Hawaii's fishermen, incidentally, copy their techniques from the Japanese as many are of Japanese descent—but their sampan engines are American, but yes.

Diesel electric power plants are fairly numerous in Hawaii. Lihue Plantation Co. uses diesel engines to power five of its generators. One is an Atlas diesel installed in 1929—a 4 cylinder 135 hp. model driving an 80 kw. generator generating 2300 volts. The other three are later Atlas models and one is a Busch-Sulzer.


Molokai Electric Co. has a number of diesel generator sets. These include two 275 hp. 6 cylinder Atlas diesels, one 525 hp. Atlas diesel and a Worthington diesel. Currently a General Motors Cleveland diesel is being acquired.

Grace Bros. Ltd., a Honolulu firm, is agent for the giant new Euclid cane hauler, now being used experimentally in the Islands at Oahu Sugar Co. It claims to be able to haul 40 tons of cane. It is driven by two GM Detroit 6-71 diesels, one driving the rear axle, and the other engine driving the front axle.

A group of LeTourneau cane haulers is now on order incorporating the diesel electric drive described in the March issue of DIESEL PROGRESS. These large units have, of course, a direct electric drive to each wheel and it is anticipated that they will have better tractive effect on wet ground and deep soil than is now currently available.

It might be emphasized that there are some 16 categories in the sugar industry on the Islands which successfully and economically use diesel engines. (1) Harrowing to chop up trash and stubble from previous harvest; (2) Subsoiling to break up soil at two foot depth; (3) Rock clearing equipment; (4) Ploughs; (5) Furrowers; (6) Field Sprays; (7) Fertilizers; (8) Fork lifts for moving irrigation flumes, also used in other similar operations; (9) Planters; (10) Replanters, when a second or "ratoon" crop is raised off the original roots; (11) Line Shapers, to restore hills and furrows for irrigation purposes after heavy equipment has passed over fields; (12) Cane Rakes, for moving out cut cane; (13) Harvester, a machine still in development stages; (14) Trucks and Cranes, for hauling cut cane; (15) Locomotives, for hauling out cut cane; (16) Irrigation pumps. And then, throughout the Islands, diesels are in general use for (17) Power plants and emergency generators; (18) on Construction equipment, public and private; (19) Marine engines; (20) in the Pineapple Industry; (21) Large Hauling trucks; (22) Miscellaneous, including other productive power purposes which are necessary for the profitable operation of a large organization such as an Hawaiian sugar or pineapple plantation, or cattle ranch.




 The Young Brothers' fleet of diesel tugs, with the exception of the *Kolo*, all tied up at the same time in Honolulu's harbor.

YOUNG BROTHER'S DIESEL TUG FLEET

By W. E. ZERBE

STARTING at the beginning of the century, in the days of sailing vessels and bumboats, Young Brothers, Ltd. of Honolulu have developed into the leading tow boat operators in the Central Pacific. In the early days, the Young boys worked long and hard hours, frequently around the clock, to serve the ships coming into the Hawaiian Islands. They provided fresh meat and vegetables for ship's stores and served as a central point for delivering latest cabled news from the mainland to provide the first contact with the outside world with the larger vessels.

Visitors to the islands always remember the warm and hearty welcome of the islanders. Incoming vessels are met several miles out of the port by Young Brothers' tugs bearing friends and relatives, and officials who board the incoming vessels and shower their guests with leis of orchids and ginger, and the other exotic tropical flowers of the islands. The first units of Young Brothers' fleet were propelled by gasoline engines. Jack Young introduced the diesel marine engine into the Hawaiian Islands with the early models of the Fairbanks-Morse CO semi-diesels. These were followed by later models of Fairbanks-Morse full diesel engines. When war broke out in 1941, the Navy took over the complete fleet and several of the larger vessels worked 24 hours per day continuously throughout the war without major overhaul. After the war, Young Brothers expanded further with the purchase of surplus vessels, augmenting their pre-war fleet.

One of the most important jobs of the Young Brothers' fleet is the inter-island towing of pineapples. During the pineapple season, the tugs and barges are on the go continuously, bringing in the pineapples from the various islands to the canneries. Some of the huge barges carry 1600 tons of pineapples each trip. Prior to the war, the tug *Mamo*, with its two 750 hp. model 37, 16 x 20, Fairbanks-Morse engines, was one of the most powerful tugs in the world. With its sister ship, the *Mikimiki*, with twin 560 hp. model 37's, the pineapples moved continuously from the various islands. Smaller barges were handled by the smaller vessels, but as the pineapple industry grew, the larger twin screw tugs became necessary to handle the tremendous quantities of pineapples involved.

Young Brothers are now in the process of modernizing their fleet. The *Mikioi* was originally built in 1920, with the old Fairbanks-Morse Type CO semi-diesel engine. Later this was replaced with one of the early Model 35 Fairbanks-Morse engines. At that time, it was one of the largest sea-going tugs in the fleet. In 1947 the hull was again repowered with a Fairbanks-Morse Model 31, 480 hp. engine, and the vessel was converted for harbor use as the pineapple industry had outgrown its capacity, although between harbor jobs, it still carries freight and pineapples between the islands.

The harbor at Kolo presented a problem. It is an extremely shallow harbor with long rolling seas which are fine for surfboards but tough for handling barges. As the pineapple plantations grew, it became necessary to build a special tug, the *Kolo*, with shallow draught to take the huge barges in and out of the harbor. These are transferred outside of the harbor to the larger tow boats. Extreme skill is required in handling the barges through the surf, as an engine failure would mean the barge might run down the tow boat. The *Kolo* was fitted with a 210 hp. Model 31 Fairbanks-Morse engine with a special pneumatic clutch, enabling the skipper to keep constant tension on the towing cable.

Last year Young Brothers rebuilt the *Mahoe*, which

was the first of Young Brothers' twin screw tugs. This vessel was originally fitted with two Fairbanks-Morse 360 hp. Model 35 engines. These have now been replaced with modern 440 hp. Model 31 engines. The growth of Young Brothers has paralleled the growth of the Hawaiian Islands. When the honor roll of Hawaiian Island commerce is inscribed, the name of the late Jack Young, Sr., who was the guiding spirit of Young Brothers as Vice-President and General Manager, will be at the top of the list.

YOUNG BROTHERS, LTD. HONOLULU FLEET

"MAMO"—Built 1931. Hull, Steel, 129 x 28 x 13. Main Engines, Twin screw Fairbanks-Morse. 2 model 37—16 x 20—750 hp. each.

"MIKIMIKI"—Built 1929. Hull, Wood, 125 x 29 x 12. Main Engines, Twin screw Fairbanks-Morse. 2 model 37—16 x 20—560 hp. each.

"ELEU"—Built 1929. Hull, Steel, 116 x 28 x 14. Main Engines—Twin screw Fairbanks-Morse. 2 model 37—16 x 20—560 hp. each.

"MAHOE"—Built 1925. Hull, Wood. Main Engines, Twin screw Fairbanks-Morse. 2 model 31A8½—440 hp. each.

"MIKIOI"—Built 1920. Hull, Wood, 88 x 21 x 10. Main Engines, Single screw Fairbanks-Morse. 2 model 31A8½—480 hp. each.

"MIKIALA" (formerly LT-393)—Built 1944 for U. S. Government. Hull, Wood, 117 x 28 x 12. Main Engines, Single screw Enterprise. Model DMQ—1200 hp.

"IKAIKA" (formerly LT-390)—Built 1944 for U. S. Government. Hull, Wood, 118 x 28 x 12. Main Engine, Single screw Enterprise. Model DMQ—1200 hp.

"MAKAALA"—Built 1914. Hull, Wood, 65 x 18 x 6. Main Engine, Single screw Fairbanks-Morse. Model 35—10 x 12½—180 hp.

"PILOT"—Built 1915. Hull, Wood, 45 x 11 x 6. Main Engine, Single screw Fairbanks-Morse. Model 36A¼—60 hp.

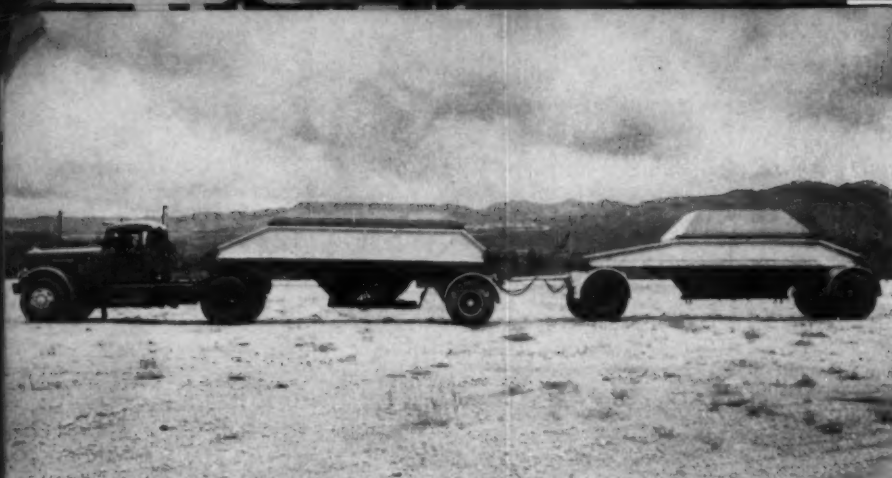
"KOLO"—Built 1947. Hull, Steel, 60 x 16 x 6. Main Engine—Single screw Fairbanks-Morse. Model 31A6¼—210 hp.

"MOMI"—Built 1931. Hull, Wood, 52 x 15 x 8. Main Engine, Single screw General Motors. Model 8-268-A—400 hp.

"HUKI"—Built 1937. Hull, Wood, 40 x 12 x 5. Main Engine, Fairbanks-Morse. Model 35E8¼—120 hp.

The diesel tug *Mahoe* which has recently been modernized with new F-M main engines and auxiliaries.

As the islands grew commercially, Young Brothers grew with them. Harbor developments meant dredging operations, operations with dump scows and tugs. Sailing ships changed to steamships and more and larger steamships required more and larger tow boats. Under the guidance of Jack Young, the fleet developed and expanded and now includes six large sea-going tugs, six more smaller harbor tugs and a fleet of fourteen barges handling ocean going towing to all parts of the world, inter-island freight and fuel oil, pineapple transportation from plantations to canneries, and all types of salvage and harbor work.



B & C Trucking Company in Honolulu uses three Autocar diesels—one 200 hp. Cummins, and two 150 hp. Cummins. From midnight Sunday to 8 a.m. Saturday, they are kept on the road constantly trucking sand across the Island of Oahu to supply Honolulu Construction & Draying Co. which manufactures concrete bricks. With the gondola type hopper they have 80,000 lbs. gross weight and carry a 24 ton pay load. The train is 65-ft. long.

B & C TRUCKING

By A. A. SMYSER

TO our way of thinking, we've got one of the most compact, efficient money-making units in the world." That's E. B. (Brownie) Clewett talking, and he's telling how his three Autocar diesels do the work of 27 10-ton dump trucks. "What we've fought towards," he continues, "is to do as much as we can with as little as we can."

B & C Trucking Co. has its home on the island of Oahu, which is less than 50 miles across. But from the time its three trucks leave the yard at midnight Sunday until they pull back in at 8 a.m. the next Saturday, they've gone about 2700 miles each, virtually without stopping. "We have all the advan-

tages of a long line haul in planning our tire costs, and the like, yet our trucks are never more than 50 miles from their operating base," Brownie explains. That makes for ease in checking up on truck conditions and keeping tires, engines and other parts in smooth-running condition.

B & C currently works entirely on one contract—hauling sand from Waimea Bay and Kahuku, where the sea brings in fresh supplies faster than B & C can truck them away, to the Honolulu Construction & Draying Co. in Honolulu for concrete, hollow tile, and other operations. Clewett started his operation in 1945 with a single 10-ton dump truck that

The B & C Trucking Co. in Honolulu figures its three Autocar diesel trucks, which it works around the clock, are the equivalent of 27 10-ton dump trucks working a regular eight hour shift. "Brownie" Clewett, the head man, faces the camera from under the shipping board he picked up in a surplus store. He's proud of the fact that no driver has either been fired or quit since the company started in 1945. The only loss has been the youth asleep on the couch, who was drafted into the army. He still drops around weekends to help on maintenance work.

he drove himself. On his first month, he grossed \$750.00 and thought he was in clover. That was before repair and maintenance costs began piling up. He soon started a strict system of cost accounting, found he could drive a big truck with no more effort than a small one, and began moving into bigger equipment. In 1947, he tried his first diesel, and now he is going into all-diesel operation—figuring happily that his three present diesels, which he keeps running around the clock, haul 27 times as much as his first dump truck, which he could operate only one shift a day. Nine drivers keep them rolling and George K. Sereno, maintenance superintendent, keeps the bodies in good condition. The engines are kept tuned by Todoki Machine and Marine Works, one of Hawaii's diesel repair specialists.

He has one 200 hp. Autocar diesel, and two 150 hp. models, each pulling a train of two gondola type hoppers, 65-ft. in length. Their gross weight of 80,000 pounds includes a 24 ton payload and enables B & C, operating over a 90 mile round trip route, to move 432 tons of sand a day. Brownie figures his first truck now has gone 780,000 miles, his second 308,000, and his third 155,000, although not all of this mileage was under his operation. How long does he think they'll last? "Forever!" His maintenance program is a careful one, patterned exactly to Autocar and Cummins engine recommendations, with drivers noting down any trouble that doesn't require immediate attention for check during the truck's "freshening up" in the yard from 8 a.m. Saturday to midnight Sunday. In that time, the trucks get washed (painted every fourth month), carefully checked, and tires moved and changed.

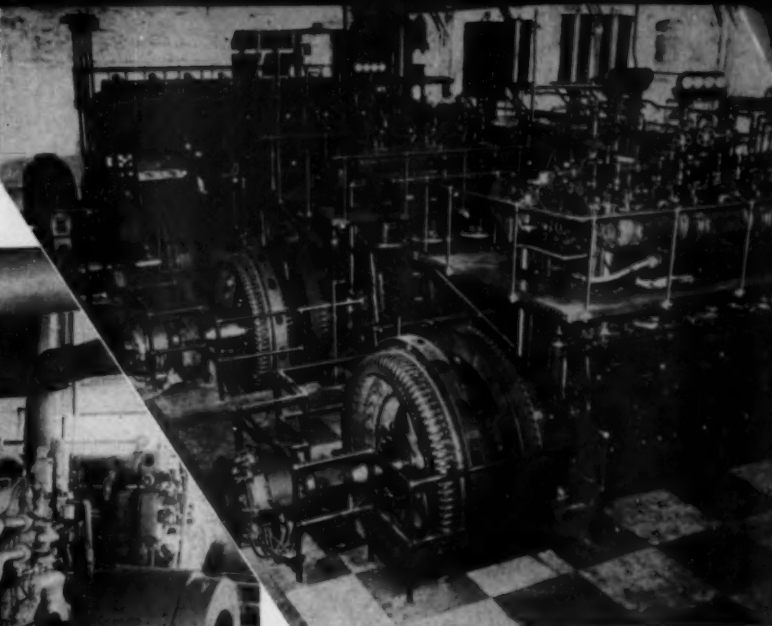
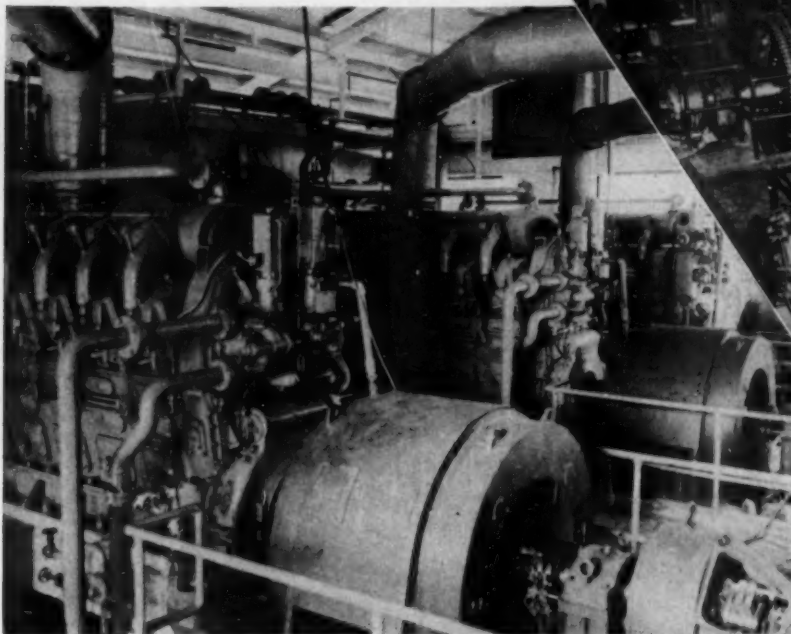
Brownie is particularly proud of his tire program, and figures he can get upwards of 185,000 miles from each of his B. F. Goodrich nylons. When he gets a tire new (it costs \$281), he first puts it up front for 30,000 to 40,000 miles, during which it shows hardly any wear. Then he moves it to the drive wheels where 8,000 to 11,000 miles run it smooth. The tire then is moved back to the trailer where it may roll another 15,000 miles before the fabric is just barely discernible and it's ready for retreading. The retreads do about 10,000 miles on the drive wheels, then 15,000 more on the trailer before they need retreading again. He's given a tire as many as nine retreads, but figures five on an average can give him 185,000 miles a tire. Each retread cost \$40.00. Tires, Brownie discovered early, were accounting for about one-third of his expense.

He's proud, too, of the fact that he's never fired a driver or had one quit (though he's lost one to the army's draft). He pays above union scale, keeps a radio and cigarette lighter in every cab, tells drivers to pull off the road whenever they want without fear of criticism from him, and has never had a driver arrested or in an accident. A police officer told him B & C's nine drivers are the most courteous on Oahu.

His reason for preferring diesels? "We have to pull a seven mile long 6 1/4% grade on the Waialua hill in each round trip. Gas just didn't have the wearing quality or the power we needed. Our diesel units cost us more (\$26,000 each) to start with, but we've more than made up for it."



DIESELS HERE AND THERE IN HAWAII



Two views of the Hilo Electric Light Company Ltd. Power Station at Hilo, Hawaii. Above are three Busch-Sulzer type B-100, 450 kw. diesel engines. Engines #1 and #2 were installed in 1931 and engine #3 was installed in 1932. Engine #4 which is a Busch-Sulzer type DHT-27, 1875 kw. was installed in 1936. To the left are three General Motors, Model 16-278A diesel engines, 1000 kw. each now being installed. The installation was not quite completed when this photograph was taken. This is the oldest and largest dieseled public utility plant in the Islands.

Oahu Railway & Land Co. doesn't use this passenger train any more, but it still uses its engines for shifting pineapple between the docks and the Honolulu canneries. It is a 44 ton GE locomotive powered by two Cat diesels.

D3400 "Caterpillar" dieseled electric set used for standby power for the Puuohoku Ranch on the Island of Molokai, Hawaii.

57





About the biggest cane hauling trucks in use in Hawaii today are the LeTourneau giants, some of which carry loads up to 50 tons, with 300 hp. Buda diesels.

A lineup of the new Tournahauler trucks being put into use by Ewa Plantation Co. LeTourneau Company developed these trucks especially for Hawaiian Sugar plantations, all with Hercules 228 hp. at 2100 rpm. diesels.

Lihue Plantation Co. because of its distant fields and the need to build expensive primary roads to shift to trucks for cane hauling is sticking with railroad operation. It has four locomotives like this, each powered by two NHB 600 Cummins' engines.

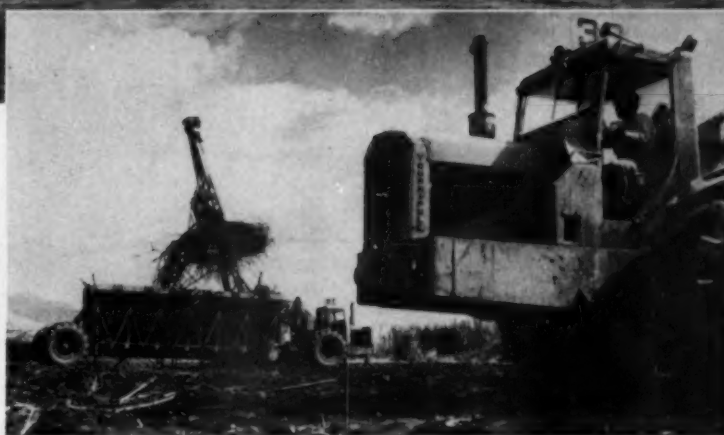
The big Kenworth-Cummins diesel truck hauling bulk sugar on contract by Honolulu Construction & Draying Co.



TRANSPORTATION



LeTourneau cane trucks in the field being loaded. The later Tournapull cane haulers have push button control, no steering wheel. Gear shifts and speed controls are by push button, too.



A Cat DW 10 truck with a W 10 wagon is used for general haulage at Waiata Agriculture Co.

59



THE machine Hawaii sugar plantations are seeking to develop is a harvester that will cut the cane, clear it of trash, and load it onto a truck. The successful formula is close at hand and a few test machines are in use but the final solution hasn't been developed yet.

These pictures show a Duncan harvester, developed by the Hawaiian Sugar Planters' Association agricultural experiment station. Four have been built so far, the first at the Theo. H. Davies, Caterpillar Branch. It is mounted on a D7 Caterpillar tractor, with auxiliary power from a Cat D 311 engine to power the cutter disc and elevator conveyors. Different models are being developed for irrigated and non-irrigated plantations.

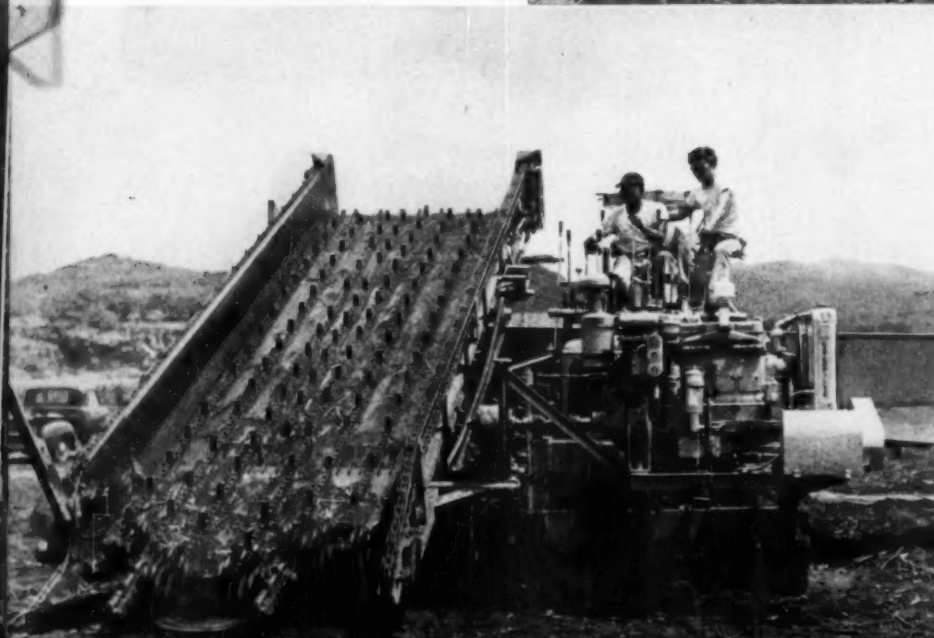
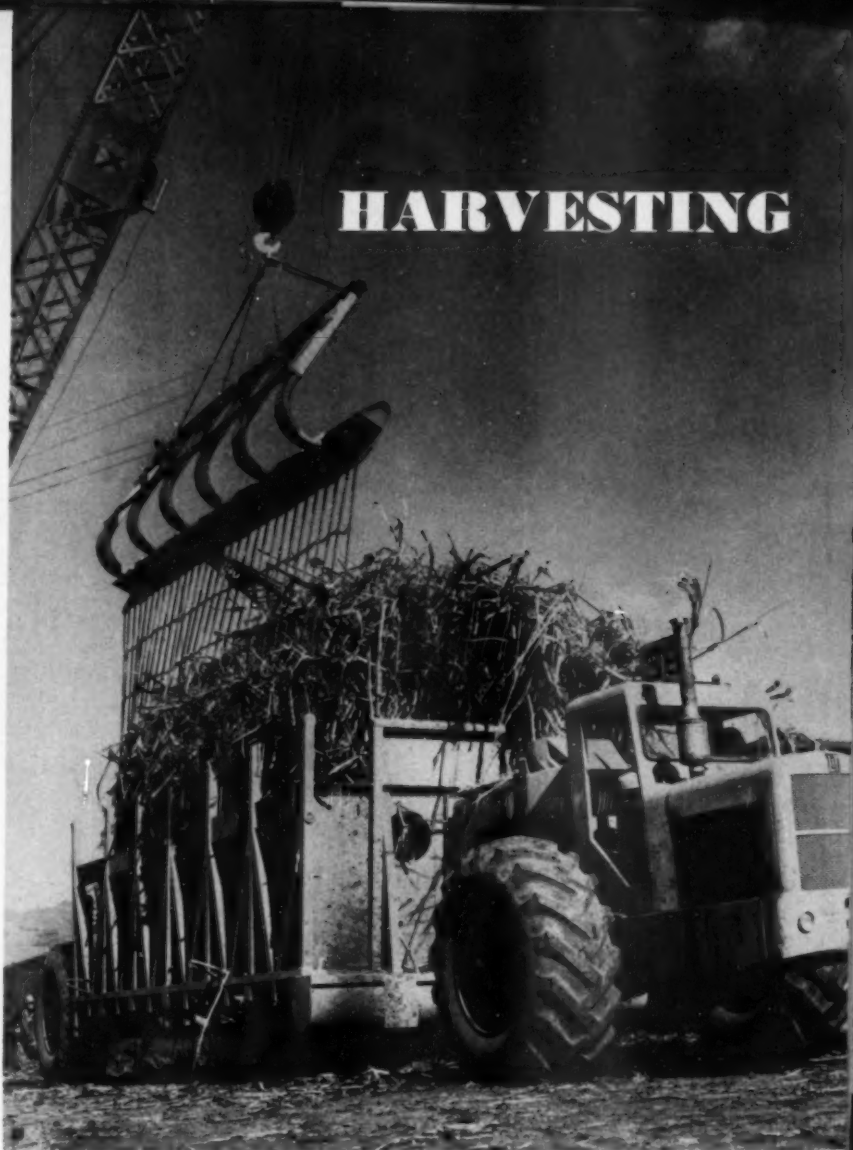
The present machine drops the cane back on the ground in windrows. Its side-mounted elevator makes it difficult to cross back and forth on a field and requires recrossing to the original starting point. A harvester with an overhead elevator is now being built experimentally.

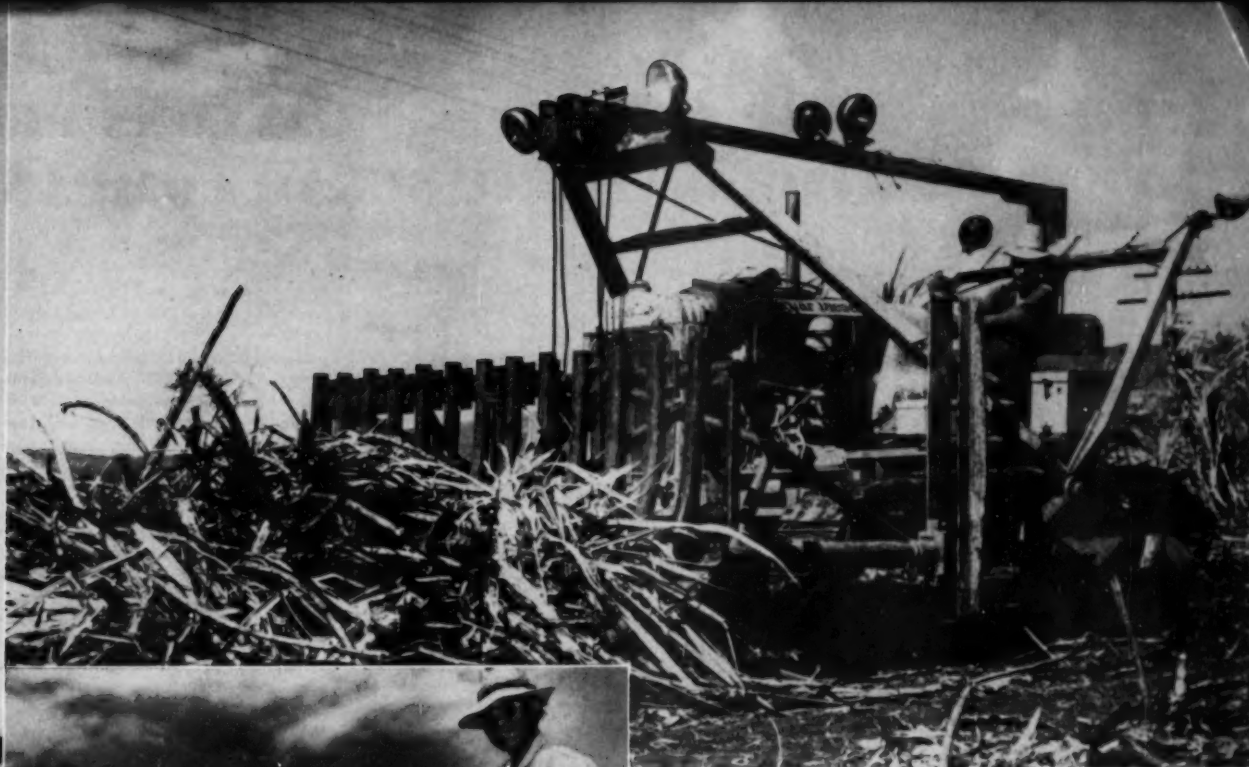
Hand cutting of cane became too expensive. In World War II, with labor short, the plantations were forced into grab harvesting. In this a grab pulled out cane roots and all, making it impossible to grow a second crop off the same roots. It also robbed the field of needed top soil. Successful machine cutters have been developed since the war, but the full harvest machine is still a problem.

A crane lifts up a chain net from the bin of a LeTourneau diesel truck, spilling the load at the plantation mill.

Three views of the Duncan harvester developed by the Hawaiian Sugar Planters Association, built by Theo. H. Davies. It is mounted on a D7 Caterpillar tractor with auxiliary power from a Cat D-311 diesel.

HARVESTING

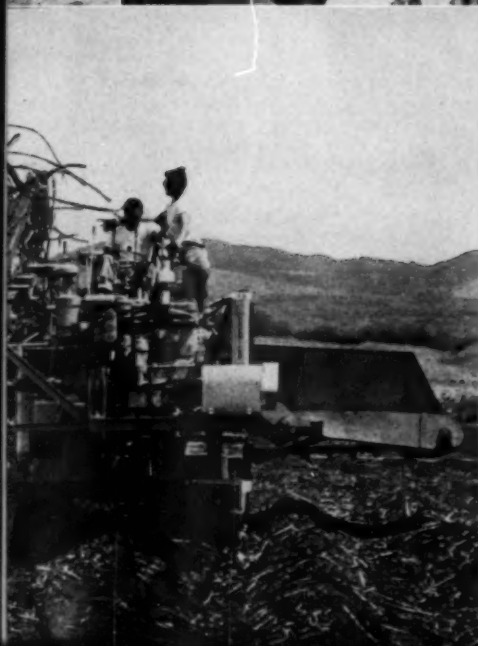




Mechanical harvesting of sugar cane in Hawaii is partly accomplished by machines such as the cane rake, mounted on a heavy duty tractor. Cane is also harvested by large grabs mounted on a mobile track laying crane. Only a small portion of Hawaiian cane, located in steep, rocky areas, is hand cut today. This is a Cat RD-7 push rake.



Skilled American farmers are these three men who operate one of the heavy-duty cane planting machines on an Hawaiian plantation. These men are typical of thousands who do the field work on the large plantations by rolling down the furrows on modern agricultural machinery. Hand operations have almost completely given way to mechanized methods. Employees have adopted new skills through plantation training programs. These new skills have brought to Hawaiian employees the highest year-round agricultural wage in the world.



DIESELS PUMP 1,519,700,000 GALLONS PER YEAR FOR THE WAILUKU SUGAR COMPANY

By HARRY G. NAGEL

THE Wailuku Sugar Company on the Island of Maui in the Hawaiian Islands operates a plantation having a total of 4,600 acres in sugar cane under cultivation, and its new diesel pumping plant pumped one and a half billion gallons of additional and much needed water in 1949. The company produces from 20,000 to 22,000 tons of 96 degree sugar per year, but the directors of the company were not satisfied that production was as high as it should be because of lack of adequate water supply. Water is the life blood of sugar cane. However, production of sugar cane at Wailuku plantation was, prior to 1948, handicapped by lack of ample water supply. 4,600 acres of cane require an average of 60 to 64 million gallons of water per day, but the present water supply from natural sources was inadequate for the demand.

The plantation is located on the base of the West Maui mountains, and the water supply was from natural sources in the mountains. Up on Kukui mountain the annual rainfall varies from 350 to 400 inches per year in normal years. However, frequently the rainfall will be far short of this total and the Wailuku plantation will have a varied water supply because of these conditions. Some years they had a supply totaling 150 million gallons per day, and other years the supply would drop to 20 million gallons per day. It was this uncertain water supply that presented the biggest problem to the plantation, and finally the directors decided to build their own pumping station and provide water for irrigation from the large underground fresh water pools that are common on all of the Hawaiian Islands.

The fresh water accumulates in underground pockets between the layers of lava. These fresh water pools are found at elevations standing as low as 1 to 2 feet above sea level and to considerably higher distances in the foothills. Apparently the pools of fresh water within the lava layers balance against the weight of salt water, the fresh water being lighter and standing at a higher level than the salt water. According to the Gylden-Herzberg theory, there should be from 38 to 40 feet of fresh water below sea level for every foot that the fresh water stands above sea level. This is based on the difference in specific gravity of salt and fresh water.

Imagine a large glass U tube 40 to 50 feet in height filled with fresh water on one side and salt water on the other side. Because of the difference in weight of fresh water and salt water, the fresh water would have a higher level than the salt water. According to the theory mentioned, 40 feet of fresh water would balance against approximately 39 feet of salt water. The water in the fresh water side would stay fresh with only a small zone of mixing at the bottom of the U.

In the underground construction the elevation of the salt water in the U tube would correspond with the sea level elevation. The elevation in the fresh water leg of the U tube would correspond with the height of the fresh water pool. A difference of 1 foot in level would represent a depth of approximately 38 to 40 feet of fresh water. A difference in elevation of 5 feet would indicate a depth of, roughly, 200 feet of fresh water in the underground chamber.

Wailuku decided to follow precedent and build an open underground pump room with an access tunnel, and to install the pumps in an underground chamber. There is an underground pumping room, 30 feet long and 22 feet wide with a 58 ft. height. There is an entrance tunnel 750 ft. long at an angle of 30 degrees from the side of the hill down to the pump chamber. The floor of the pump room is at an elevation of 30 ft. above sea level as compared with the 26 ft. standing water level in the pool.

From the floor of the underground pump room, three wells were drilled 10 feet apart. The first 150 ft. of the wells were 25 inches dia. followed by 160 ft. of 22 inch dia. on two holes and 17 inch dia. on the third, making a total depth of a little over 300 ft. for each well. In each of these wells an 18 inch, 4 stage, Fairbanks-Morse oil lubricated turbine pump was installed. The pumps were each rated 3500 gpm. at 440 ft. discharge head when discharging into the lower ditch and 3025 gpm. at 490 ft. head when discharging into the upper ditch. Each pump is driven by a Fairbanks-Morse 450 hp., 1750 rpm., 23 volt, vertical hollow shaft, protected frame motor fitted with special heaters for keeping the motor warm when not in use to avoid condensation from the high humidity conditions.

Each pump has five 10 ft. sections of column, placing the bowls 50 ft. below the level of the pump room, or approximately 20 ft. below sea level. The deep setting of the pumps as compared with the 4 ft. difference between standing water level and pump room floor level was a precaution against excessive drawdown. The standing water level of 26 ft. above sea level was an unusual condition and the plantation would have considered itself lucky if the water level dropped almost to sea level. To the amazement and joy of all concerned, the actual drawdown with all three pumps in operation was less than 10 ft. under maximum pumping conditions, and when the pumps are shut down the level in the well rises immediately to its standing level indicating that there is ample depth of water in the pool, and extremely constant flow into the pool from the mountain area. It appears that there is ample water available for even additional pumps for greater water supply. The new

pumping station, therefore, assures an ample water supply even in the driest years, and assures both increased and constant growth of an even better quality of cane through ample irrigation water supply, completely independent of variations in the rainfall.

To supply power to this underground pumping station consisting of three 450 hp. motors, a complete Fairbanks-Morse 2000 hp. diesel electric power station was installed on the surface at the mouth of the underground tunnel. The engine installed is a Fairbanks-Morse model 33F16, 10 cyl. 16x20, 2 cycle engine operating at 300 rpm. and direct connected to a Fairbanks-Morse 1400 kw. alternator generating power at 3 phase, 60 cycle, 2400 volts. Because of the large size of the motors installed, the alternator was of a special design rated 2500 kva., 70 per cent power factor to handle the inrush current of the three motors which constitute practically the only load on the generating equipment.

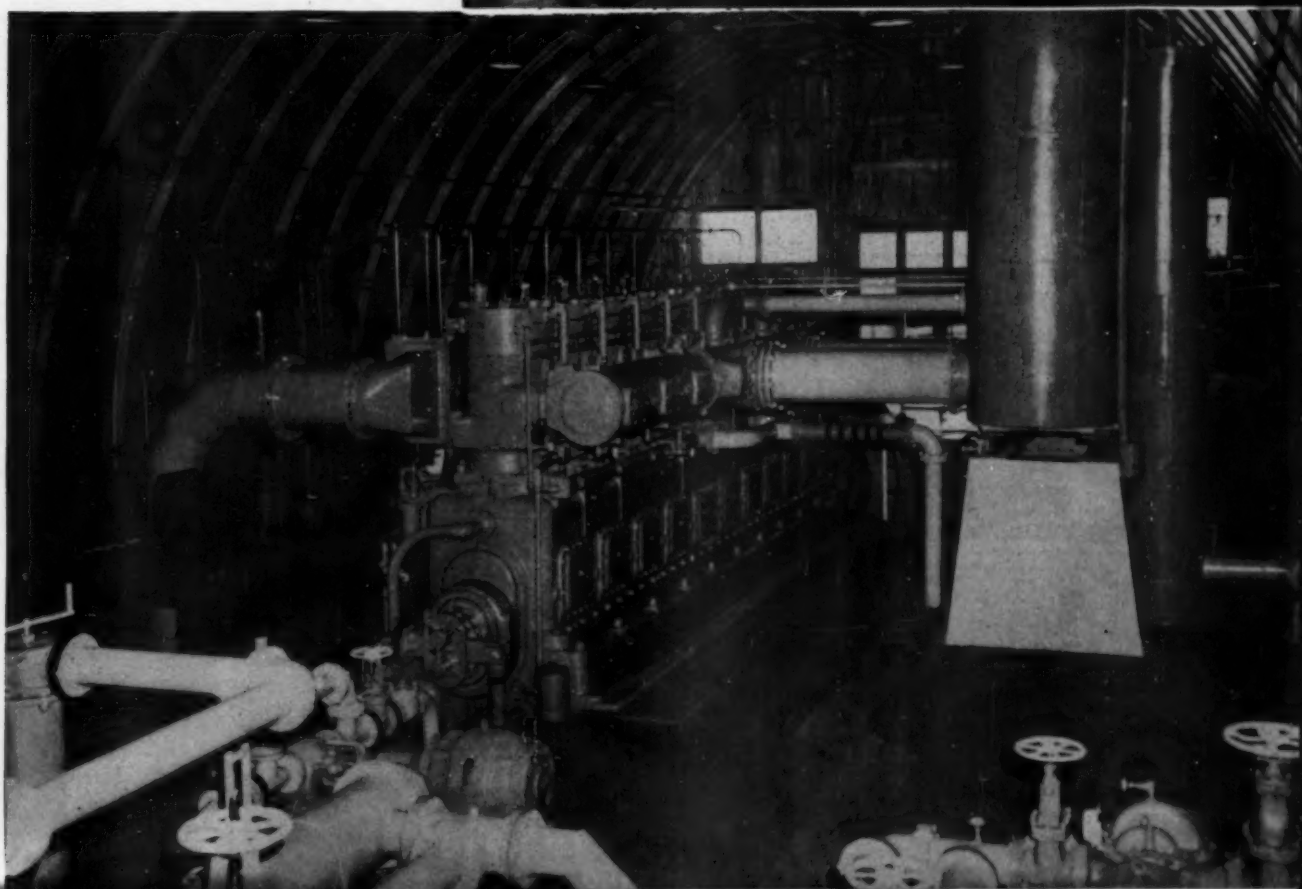
A small auxiliary diesel generator set of 100 kw. capacity is installed in the plant to supply lighting and to start circulating pumps for the cooling water supply and lubricating oil system before the engine is started. A small Fairbanks-Morse vertical 1 kw. motor generator set is also operated from the auxiliary set to supply excitation to the field of the main exciter during the starting period. The scavenging air blower motor is connected directly to the alternator terminals through its own breaker independently of the main power supply breaker to the station bus. In starting the exciter field is forced by the small generator set so that as quickly as the generator turns over on the starting air, the exciter begins to generate voltage in accordance with the slow engine speed. Sufficient voltage is generated to excite the alternator which, in turn, supplies low voltage, low frequency power to the scavenging blower, and as the engine picks up speed on the starting air the frequency and voltage buildup accelerating the scavenging blower picks up speed likewise delivering air to the engine as it accelerates with the result that the entire unit can be brought up to full speed in from 10 to 15 seconds without difficulty.

The engine is built with oil jacketed pistons and with a complete force circulating system by which oil is picked up from the engine crankcase, pumped through the oil cooler and delivered back to the drilled crankshaft of the engine from which oil is circulated to the main bearings, crankpin bearings, through the drilled connecting rods to the wrist pin bearings, and then into the crown of the piston and through the oil jacket to the piston, and then returned to the crankcase. A portion of this oil is delivered to Madison Kipp force feed lubricators

from which oil is delivered to the cylinder walls in needed quantities from the force feed lubricators.

Controls of the engine and underground pumping station are concentrated in the large switchboard at one side of the building. The switchboard includes the main generator panel, scavenging motor control panel, controls for the starting motor generator set, automatic voltage regulator, auxiliary power supply panel, and three automatic motor starter panels controlling the operation of the pump. The motor starting panels incorporate automatic reduced voltage starters, push-button operated, either from the engine room or by remote pushbuttons in the underground pumping room.

In normal operation of the pumping station, all three pumps will usually be in operation. The combined output of the three pumps is carried through a single 24 inch discharge line which is installed in the tunnel from the pump room to the surface. Discharge from this pipe line may go directly into the lower Hopoi ditch at a pumping head of approximately 425 ft., or it may be diverted through an additional discharge pipe up the hill to the upper "Waihee ditch." From these ditches the water is carried several miles along the base of the hills. Of the 2000 acres approximately 1200 lay below the lower ditch with the balance being served from the upper ditch. This increased water supply has resulted in an annual increased output of from 4000 to 5000 tons of sugar, or at least 29% increase in production.





Supervising & Operating Engineers Section

CONDUCTED BY R. L. GREGORY

GRAND HAVEN, MICHIGAN EXPANDS PLANT

ORDINARILY, this section of DIESEL PROGRESS is not devoted to the subject of any individual plant as herein discussed. However, occasionally in going through various plants, we find these plants with interesting problems and answers, which many of our readers are experiencing at the present time. When such is the case, we do like to pass this information on to our readers, in the hope that they will find something akin to their own individual problems and thus profit by reading the article. Such is the case as presented by the Municipal plant at Grand Haven, Michigan.

Your writer recently had the pleasure of spending a day at this plant, and in so doing, had a very interesting talk with Supt. J. Bryan Sims. Due to an increased demand by both Industry and Domestic users, the Board of Public Works realized that something definitely had to be done in order to meet this growing demand. The problem of increased capacity became the urgent problem of the moment, and under the able supervision of Supt. Sims, the Board of Public Works, with the cooperation of the Council, decided to enlighten the citizens as to the situation and requirements. This program was carried out and the citizens felt that an expansion program to their plant was the immediate answer. In talking over this problem Supt. Sims gave a very logical and practical statement as to his and the Board's views on the matter. For several years past, they have taken the attitude that electric utility rates should have a direct relationship to actual cost, and consequently through good management, increased efficiency etc. they have been able to reduce their rates in line with this viewpoint, and it was not pleasant for them to contemplate a reversal of this situation by adding materially to the capacity of the plant. As Supt. Sims stated, "The electric utility industry whether municipally or privately owned, has held the line almost alone, against a vicious inflationary spiral of rising costs for the last few years."

As an example he stated that everyone knows that the price of fuel has risen drastically, that the householder has had annual, if not semi-annual and in many cases, more frequent raises in his coal bill. That the Utility's fuel bills have risen too, but by shortcuts and careful management this has in many cases been absorbed. As stated in many of our previous articles he also felt that few customers would be expected to realize the price increases in materials used by the utility, as to just what extent these increases have been in fuel, labor, repair parts, transmission equipment, etc. The customer's knowledge of these points is only a general one,

and not to what extent they have actually increased. Supt. Sims further felt that it was the duty of utility management and superintendents to apprise the citizens of the actual conditions, since they should be vitally interested as the plant was their property. He further stated that perhaps many wondered how they had been able to hold their own and maintain rates in spite of rising costs, and stated that in some cases, they had not actually been able to do so. He further wondered if some might have felt that this had been accomplished because excessive rates were being charged prior to the time that inflationary trends became so acute. But he doubted that anyone in industry would agree to that point of view.

What actually had happened was that they had been doing an increasing volume of business on a greatly decreasing net, per unit sold. They had crowded their generating equipment and distribution lines with more volume and in many instances without increasing the fixed costs substantially. The average gross intake, and incidentally the net return per kwh., thus became lower and lower as the volume increased, particularly in the lower rate brackets. On the side of expansion it was felt that some savings in production costs might be accomplished by the installation of more efficient generating equipment, since they, at Grand Haven, like many other plants, were forced to utilize outmoded and antiquated and inefficient generating equipment at certain times of the year to keep up with the plant demand. On the other hand, they felt that the point of new equipment due to increased construction costs, would increase

future fixed charges, should not be overlooked. Much more could be added along this line, but suffice to say, when it came to the last decision, all agreed that plant expansion was desirable and are now going ahead with this program.

The present expansion of the plant will increase it almost 100% in generating capacity, and when completed will give a total of 18,430 kw. rated capacity against 9,430 kw. capacity before the present installations were begun. The plant at Grand Haven has been operated since 1896, the original generating equipment consisted of a steam boiler plant with three small turbo driven generators. Although antiquated and outmoded, this plant if necessity requires can still be operated and has been up until recently when peak demand requires it. In 1930, two 800 kw. generating units were added, they being driven by 2 DeLavernge diesels. After this installation further equipment was installed in 1934, 1937, 1942, and 1946. These were all Nordberg units and when the 1946 installation was made, the plant was extended as shown and ample room was left for the installation of another large unit in the bay nearest the reader.

Early in the present year, the demand on the plant increased to such an extent that the Board of Public Works, purchased two 1000 kw. factory rebuilt General Motors, medium speed units. These were placed in the basement of the plant and were to be used primarily as standby auxiliary units, at a cost of \$90,000 for the two plus installation charges. This was done in spite of the fact that a new Nordberg unit of 5000 kw. capacity which is to be



erected in the new bay, was being built at the factory, and at the present time is under erection in the plant.

Looking ahead, the Board also ordered another Nordberg unit of 3000 kw. capacity which is now on the ground and will replace one of the old DeLavernes which is to be removed. The total cost of expansion will amount to around \$1,000,000 and when completed will give Grand Haven an excellent Municipal Plant, capable of handling all demands on the plant. However, the Board of Public Works of Grand Haven, along with Supt. Sims are looking to the future and Supt. Sims indicated that he expected need for future expansion when he stated that long range plans call for the next installations to consist of modern steam equipment, generally considered more efficient than diesel units in the large sizes, above 10,000 kw. One thing is to be noted in particular about this expansion program, and that is that the whole program will be paid by revenues from the electric department and not by general obligation bonds on the city.

The Board and Supt. Sims hold to the opinion that successful operation of a municipal plant demands that electric department revenues be used primarily for improvement of plant facilities and services rather than for paying bills of other city departments and projects. The other city departments of Grand Haven pay for the electricity they use. As an example, he quoted \$12,000 a year as the annual charge for street lighting. In return for this payment by other city departments, the Board of Public Works pays an amount equivalent to taxes, paying from \$6,000 to \$8,000 annually for both city and school taxes and, in addition to this, annually pays \$3,600 as rent for office space for the Board and its personnel in the modern City Hall. Mr. Sims also credited popular support of the citizens for much of the success of the Grand Haven plant, stating that ever since the proposed sale of

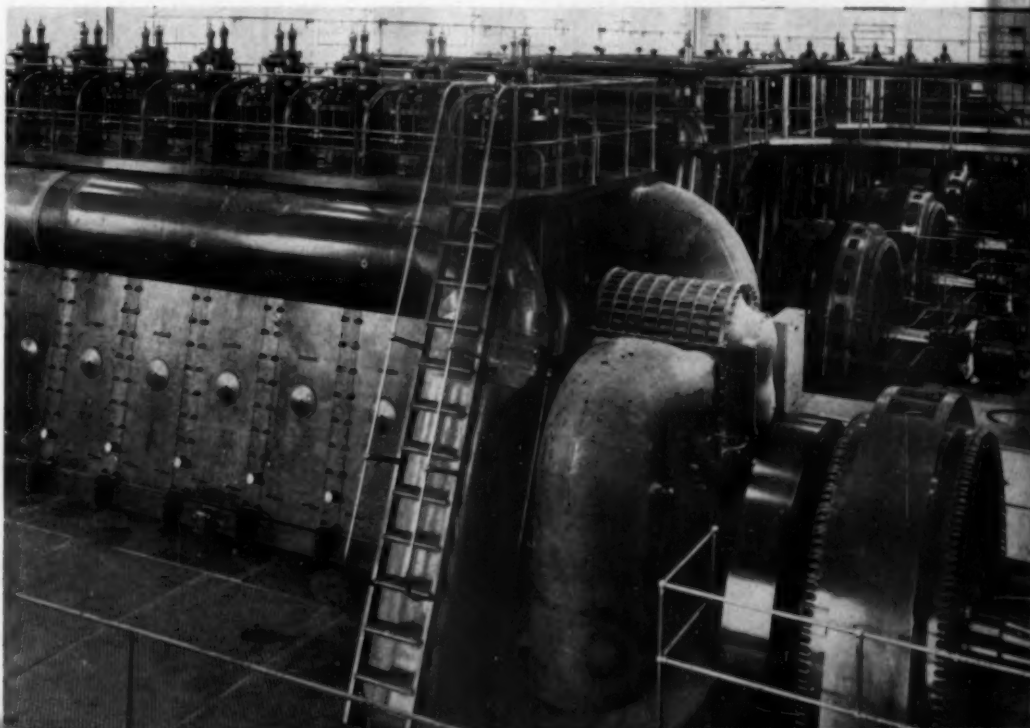
the municipal plant for \$1,200,000 to a private utility in 1930 was defeated, the public sentiment had become more towards municipal ownership. The issue of this sale, defeated by popular vote, came at a time when the installation of the two DeLavernes units was being considered.

Figure 1 shows the present installations without the 5,000 and 3,000 units which are under erection and should be in operation around the first of the year. The two General Motors standby units, being located in the basement are not seen. They have been doing yeoman duty for the plant under

the present high demand of the plant and Supt. Sims has been thankful for their installation as standby units on many occasions.

Space will not permit a full discussion of rates etc., in this article, but suffice to say that they are right in line with competitive plants, both private and municipally owned, and Supt. Sims hopes to be able to hold the line in spite of rising costs by the addition of his new and more efficient units. Our hats off to Supt. Sims and the Board, along with the Council and citizens of Grand Haven for a job well done.

Figure 1 shows the present installations without the 5,000 and 3,000 units which are under erection and should be in operation around the first of the year. The two General Motors standby units, being located in the basement are not seen. They have been doing yeoman duty for the plant under the present high demand on the plant and Supt. Sims has been thankful for their installation as standby units on many occasions.





WHAT'S GOING ON IN ENGLAND

CONDUCTED BY HAMISH FERGUSON

Hamish Ferguson was appointed Secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical assistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr. Ferguson continues to do independent consulting work.

The Napier Composite Engine

AT the pre-view of the Society of British Aircraft Constructors' Display at Farnborough on the 11th of September, 1951, the Napier "Nomad" engine was exhibited for the first time. The engine was installed in the nose of a "Lincoln" aircraft which had been fitted up as a flying test bed. This new development is not a conversion but has been designed as a compounded engine to go into operational service for a specific application in air transport. The underlying idea has been to produce a power unit having exceptionally high thermal efficiency coupled with a correspondingly low fuel consumption, with the object of enabling an aircraft to maintain a long duration of flight while carrying a comparatively small weight of fuel. Achievement of this object will, of course, result in an appreciable increase in the payloads which may be carried, and the primary purpose of the "Nomad" power unit is to make possible a much more economical air transport over long distances.

The engine comprises a 12-cylinder horizontally opposed compression ignition engine which delivers power into one half of a counter-rotating propeller, the engine being supercharged by an axial compressor and a centrifugal compressor in series. Exhaust gas from the engine is fed into a gas turbine, the power from which is delivered into the other half of the propeller. Two auxiliary combustion chambers are fitted in which additional fuel may be burned to provide maximum power for take-off, when an auxiliary turbine is used.

Leading particulars relating to engine are: Power for take-off (Sea level static)—3,000 shaft horsepower plus 320 lbs. thrust. Fuel consumption at maximum continuous power (Sea level static)—0.360 lbs. per effective horsepower per hour. (Aviation kerosene or diesel fuel.) Net dry weight—4,200 lbs. Overall dimensions—Length, 126½ in. Width, 58¼ in. Depth, 49¼ in.

Esso's Fawley Refinery

Europe's largest oil refinery at Fawley, Southampton, was officially opened by the Prime Minister on September 14th, 1951. Previous speakers had been Mr. Leonard Sinclair, Chairman of Esso Petroleum Company, followed by Mr. Frank Abrams, Chairman of Standard Oil Company (New Jersey). A most satisfying feature of the project was the friendly co-operation which had been in evidence throughout the 2 years of building and which had made it possible to complete the work 4 months ahead of schedule in spite of adverse weather and other conditions. 5,000 British engineers and workmen had carried out the work of construction under the direction of some 70 American engineers and supervisors. The whole project was designed in America and some items of the equipment were built there, but the greater part of the materials and plant were produced in Britain.

Basic facts on the Fawley Refinery are: Site clearance began July, 1949. The refinery has been completed four months ahead of schedule, in just over two years and cost £37,500,000. It is the largest refinery in Europe and covers 450 acres. When in

full operation it will produce 6,500,000 tons of petroleum products annually, and before the end of this year more than a million gallons of motor spirit a day.

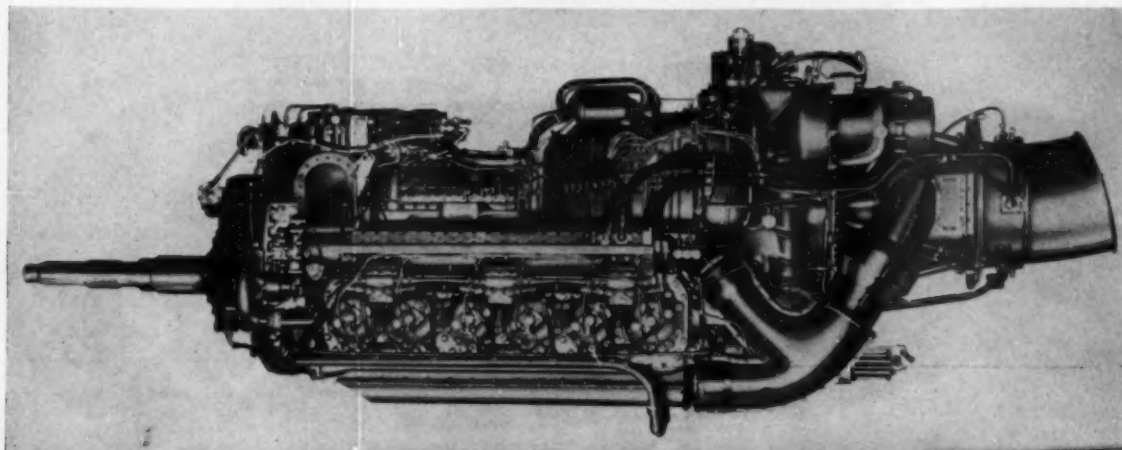
Major units comprise two pipestills, a catalytic cracking plant with light ends and polymerization facilities; and an Edleau plant (sulphur dioxide treating of kerosene and gas oil). Other treating and sweetening plants for petrol, lubricating oils and tractor fuels. At the peak period of construction more than 5,000 men were working on the refinery. A permanent staff of 2,500 will run it.

Materials used in construction included: 100,000 tons of steel, 300 miles of steel, cast-iron and concrete pipes, 200 miles of electrical wiring, 100,000 cubic yards of concrete, 12,000 valves, 220 pumps and 1,600 lb. of mercury.

The refinery will operate on predominantly sterling crude oil imported from Middle East sources. When in full operation the refinery will supply nearly 30 per cent of the present total demand of the British Isles. Compared with the cost of importing a similar quantity of refined petroleum products, the refinery will effect a saving in foreign exchange of more than two million dollars a week. For processing and cooling, more than 4¼ million gallons of water an hour will be used.

The new marine terminal with its 3,200-foot-long jetty provides simultaneous berthing accommodations for four of the largest oil tankers afloat or contemplated, as well as for smaller coastal tankers.

Napier composite engine.



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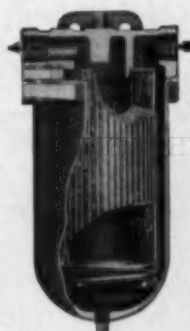
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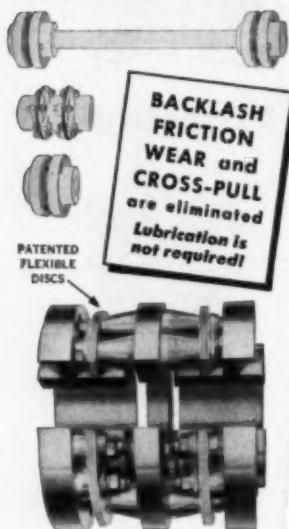
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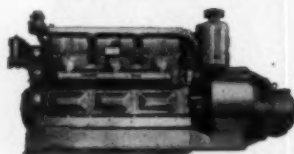
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Fully Automatic Diesel Generators For Navy Radio Station

KING-KNIGHT Company, Engineers and Manufacturers, of San Francisco, have recently shipped two fully automatic diesel-generator units for installation in a Navy Radio Station in Hawaii. These units, rated at 200 kw. and tested at 250 kw., are powered by six cylinder turbo-charged diesels built by the Sterling Engine Company of Buffalo, New York. The generators and exciters are Westinghouse. Of particular interest in these installations is the very elaborate radio-interference shielding unit built into the generators and exciters. All leads, even those to the space heaters, are grounded through capacitors, the exciter is driven from the alternator shaft through an insulated coupling and the alternator slip rings are completely enclosed in a special sheet steel housing built within the alternator frame. The design is entirely new and, upon completion of manufacture at the Westinghouse East Pittsburgh Works, extensive tests were conducted in a specially constructed shielded room. It is believed that these generators represent the most painstaking efforts to reduce radio interference to a minimum that have yet been undertaken.

The automatic control equipment, designed and constructed by King-Knight Company, will put these units "on-the-line" in the shortest time deemed to be consistent with a reasonable regard for the well-being of the engines. Electric heaters under thermostat control maintain the engine water jackets at a temperature of 120°F. while the engines are at rest. The Navy Engineers stipulated that the units should start upon failure of the normal power but, in order to avoid starting upon very short duration failures, cranking should not be commenced until 7 seconds after normal power had failed. King-Knight Company therefore decided to use this 7 second period to prime the lubricating oil system and installed an auxiliary lubricating oil pump powered by a 32 volt dc. motor. The units are at operating speed and volt-

age in less than 10 seconds after cranking commences. The generating sets are unit assemblies of engine, generator and exciter mounted on a structural steel main frame. Cooling is by sectional core Yates-American radiator with propeller fan, belt driven from the front end of the engine crankshaft. A separate oil cooling section is mounted behind the upper portion of the radiator. Water temperature is controlled by a Powers Regulator. The operating speed is 900 rpm. and the power output is 3 phase, 120/208 volts.



Six-cylinder 200 kw. Sterling diesel with a Westinghouse generator and exciter. Note the Powers Regulator on the water line, Leeco Neville starting generator, Alnor Pyrometer, Elliot supercharger, Chicago Metal Hose exhaust connection, and Yates-American radiator.

Upon completion of assembly each unit was subjected to a 7 hour load run, the last two hours of which were at 250 kw. output. These runs demonstrated the very fine fuel economy of the Sterling Engines; fuel consumption at full rated load running about 0.51 lbs. per kilowatt hour of generator output. This is an overall figure since the engines are driving all of their own auxiliaries including the cooling fans. The installation of the two units in the field will be handled by Ben Hayashi, Ltd., General Contractor, of Honolulu, with the technical assistance of T. E. Ludlam, III, Engineer for The Hawaiian Electric Company, Ltd., who are Westinghouse agents in the Territory. Ralph W. Hart, Jr., Chief Engineer for King-Knight Company, will put the installed units into operation and will supervise field tests.

RADIO DIESELS

THERE are more ways than one to skin a cat, and also more ways than one to get more production out of your diesel farm equipment and other heavy vehicles. The various Hawaii plantations represented by American Factors Ltd. all can cite one good way. L. A. McDonnell, American Factors plantation engineer, decided in 1949 it would be worthwhile to study the value of a radio communications system to direct the movements of heavy plantation equipment.

AmFac decided to invest \$15,000 in a test installation at the 14,000 acre Olaa Sugar Co., a plantation that was having a nip-and-tuck battle to stay above water financially. Olaa has a fleet of some 190 trucks, tractors, cranes and other vehicles, both diesel and non-diesel. (The 28 plantations in Hawaii have anywhere from two to 400 pieces of equipment each.) Olaa is fairly average for its size



A radiophone installation in a Northwest crane at Olaa Sugar Company.

in output, producing about 45,000 tons of sugar a year—out of a year's crop of about 1,000,000 tons from Hawaii. Olaa figures the experiment saved it \$38,000 in its first year alone. Now all six other AmFac plantations—Grove Farm, KeKaha, Lihue,

Oahu Sugar, Pioneer Mill and Waimea Sugar—are following suit. So are some plantations of other agencies.

The layouts have cost anywhere from \$10,000 to \$15,000 a plantation. The first installation at Olaa was 152 megacycles frequency. Others found they got better range at 49 or 43 megacycles. A typical layout consists of: (1) A Transmitter at the high point in elevation of the plantation; (2) A master control panel directly across from the mill; (3) Secondary control panels in the mill, the garage and the main office; (4) Radio sending and receiving phones in all harvest cranes (Olaa has 7) and in about 15 cars and pickup trucks used by the department heads and supervisors.

Conversation can be car-to-car, car-to-central or central-to-car. Radio technique is used. Receivers are kept open at all times and everyone is in on all conversations. The first use was intended for dispatching and control of cane trucks. Soon repair service was handled over the system and now more and more responsibilities are put on it, until plantation people wonder how they ever got along without it. Bottlenecks in busy fields can be prevented, equipment can be quickly shifted from one field to another, and repairs can be organized swiftly. "It's great stuff," Mr. McDonnell says.

Executive Engineer at Wellsville



H. V. Rasmussen

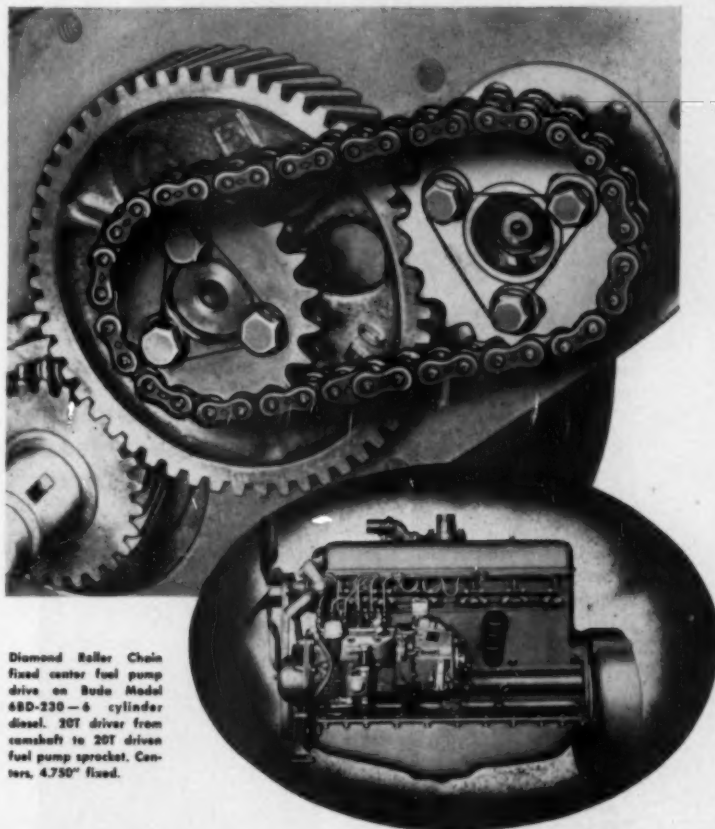
Mr. H. V. Rasmussen has been appointed executive engineer at the Wellsville, N. Y. plant of Worthington Pump and Machinery Corporation, according to an announcement by H. A. Feldbush, vice president in charge of engineering. Mr. Rasmussen was graduated with an M.E. degree from the Institute of Technology, Copenhagen, Denmark, in 1920 and did graduate work at the Massachusetts Institute of Technology. Well known in the steam turbine engineering field, he has spent a number of years with both the Westinghouse Electric Corporation and the DeLaval Steam Turbine Company. During World War II he was a consultant for National Defense Research at Columbia University, and a representative on both the Navy-Industry Committee on Propulsion Turbines and the advisory committee of the International Electro-Technical Commission. Mr. Rasmussen is a member of the American Society of Mechanical Engineers and a civilian member of the American Society of Naval Engineers.



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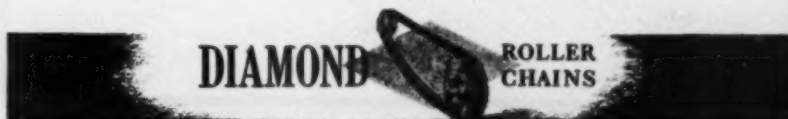
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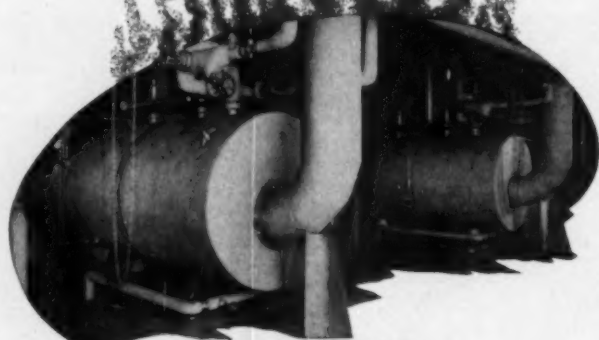
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Automatic Controls

In figure E water is low and there is less effective heating surface (heating surface in contact with water), hence lower steaming rate.

In figure F water is high and gives greater effective heating surface—higher steaming rate. Steam pressure regulated valves control the amount of water to produce desired steam capacity.

FIG. E

FIG. F



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DEPT. W1 Gentlemen: Please send me your Bulletin on Heat Recovery Silencers



BMX91

NAME _____
COMPANY _____
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Zollner Gets Al-Fin License for Bi-Metallic Pistons

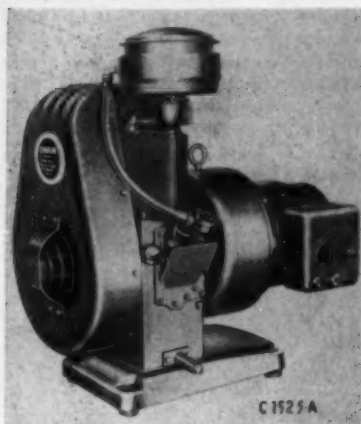
Farmingdale, L.I., N.Y.—A license for the manufacture of molecular bonded bi-metallic pistons has been granted by the Al-Fin Division of the Fairchild Engine and Airplane Corporation to the Zollner Machine Works, of Fort Wayne, Indiana, it was announced here recently by M. V. Little, assistant general manager of Al-Fin. Under the terms of the license agreement, the Aluminum Company of America and the Bohn Aluminum and Brass Corporation will use the patented Al-Fin process in bonding and casting operations in production of piston castings for Zollner. Bi-metallic pistons will have an upper ring carrier of hard nickel alloy cast iron or plain cast iron permanently bonded into the aluminum piston body. A tough, long wearing groove is, in this manner, provided for the upper piston ring which takes about 80 per cent of the wear. Excessive wear of the top ring land is eliminated and the likelihood of broken piston rings, which can ruin a cylinder wall or piston—or even wreck an engine—is reduced considerably. Service experience has proved that piston life is increased markedly by such bi-metallic construction, some bi-metallic pistons having operated in excess of 500,000 miles in mountainous territory.

The top ring groove wears faster than the other ring grooves because it is exposed to the most intense heat, receives the least lubrication, and is subject to abrasion from dust, etc., coming in through the air intake. "Blow-by" allowed by excessive ring groove wear results in greater oil consumption and power loss. Zollner will provide bi-metallic pistons for use as original equipment and for installation as replacements at time of overhaul from many of the leading heavy-duty bus and truck engines, including diesel engines. Zollner supplies heavy-duty pistons to such outstanding manufacturers as Continental, Cummins Diesel, Buda, Twin Coach, Hercules, Waukesha, International Harvester, Mack, and General Motors. The Al-Fin process, used to produce bi-metallic pistons, is a patented casting method of producing bi-metallic assemblies of aluminum combined with ferrous metals by a molecular bond. It was developed by Fairchild, originally, to improve the cooling of aircraft cylinder barrels by bonding aluminum fins to the steel of the barrels. Many other applications have been developed which take advantage of the strength and hardness properties of steel or iron and the heat dissipation, light weight, and bearing and corrosion resistant properties of aluminum and its alloys. Among the more widely known applications are bi-metallic brake drums, bi-metallic sleeve bearings, lightweight housings with bonded-in ferrous bearing retainers, aluminum-surfaced piston trunks for very large diesel engines, eddy current clutches and stainless steel cooking ware with 1/4-in. of aluminum bonded to the bottom for heat diffusion.



DIESEL PROGRESS

New Diesel Electric Plant



A new 5,000-watt diesel electric plant, powered by an air-cooled full-diesel Onan engine, is announced by D. W. Onan & Sons Inc. Simplified plant design makes it possible for anyone to operate and service this model 3DSP-1E diesel unit. Push-switch control for electric cranking, manual compression release, and an electrically heated glow-plug for cold weather starting are provided.

The plant is driven by a four-cycle single-cylinder Onan DSP diesel engine which incorporates new engineering features that have increased power output and operating efficiency. Exceptional operating economy has been achieved . . . approximately 0.155 gallon of low-cost furnace oil is consumed per kilowatt hour at full rated load. This compact and easily installed model generates 115-volt, 60-cycle, single-phase current. Other a.c. models available in single-phase produce 230 volts and 115/230 volts. A 32-volt battery charging model can also be supplied. All models are conservatively rated to provide ample overload protection. Complete specifications may be obtained by writing to DIESEL PROGRESS, File 94, P. O. Box 8458, Cole Station, Los Angeles 46, Calif.

Directs Export Engine Sales



Dale W. Blanton

Appointment of Dale W. Blanton to direct export engine sales in San Francisco for Enterprise Engine & Machinery Co. was announced by James E. Watson, general sales manager. The new head of export engine sales was engaged in a similar capacity while with Atlas Imperial Diesel Engine Company from 1940 to 1950, with the exception of his four years of service with the Navy during World War II. During that period, Mr. Blanton attended the University of Illinois and Fairbanks-Morse naval diesel engineering schools. He was later an instructor of diesel engineering at the University of Illinois.

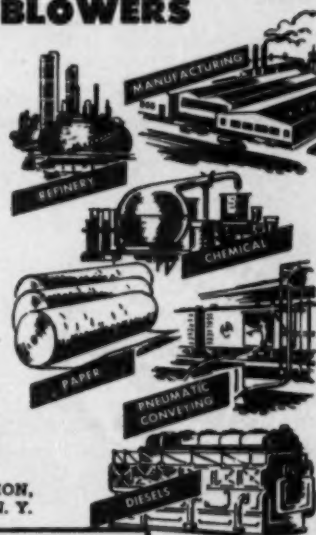
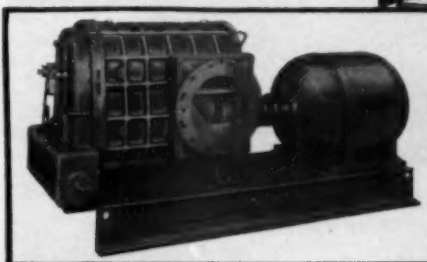
DIESEL ENGINE CATALOG is now available in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 79.

NOVEMBER 1951

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Consultant on West Coast Sales



Charles Eben Wilson

Charles Eben Wilson, sales vice president of Worthington Pump and Machinery Corporation, Harrison, N. J., has been appointed a West Coast consultant on sales problems according to an announcement by H. C. Ramsey, president of Worthington. In 1946 Mr. Wilson, in addition to his other duties, was made president of the Worthington-Gamon Meter Corporation, then a Worthington subsidiary. At that

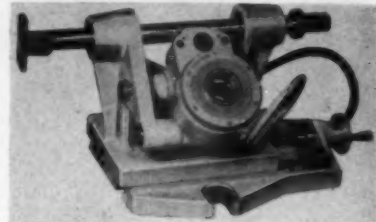
time he became the third Charles E. Wilson to be a corporation president. The others were Charles Erwin Wilson of General Motors and Charles Edward Wilson of General Electric. The latter is now famous as the Director of the Office of Defense Mobilization in Washington. Mr. Wilson retired from his present position and activities in corporation affairs effective October 1st, but continues in a consulting capacity on sales problems at Worthington's offices in Los Angeles, San Francisco, Seattle and Salt Lake City.

Diesel Design Consultant

John Ostborg who has been Assistant Chief Engineer in charge of design with the Engine Division

of the National Supply Company, has resigned and has opened an office at 444 East Main Street, Springfield, Ohio where he will operate as a Diesel Design Consultant. He plans to undertake the design of whole engines, redesigning of engines or component parts of engines. He is set up to render a complete service for investigation, calculation, designing and detailing.

Optical Cam Rise Gauge



The cam rise gauging device shown is designed to measure cam contours (both angle and eccentricity) by optical means, and to simplify and speed up accurate eccentricity measurements. The deviation in a cam surface at any angle of arc, from maximum to minimum radii, can be quickly measured to ten thousandths of an inch. Reading is direct to normal eye distance, no focusing is necessary and errors inherent in mechanical gauging devices are eliminated. Because of its simplicity the chances for human error are reduced to a minimum. For angular measurements the cam rise gauge is used with a dividing head and tail stock to position the cam. The gauge consists of a base for positioning and securing the instrument, a screw adjustment for moving the optical system into contact with the cam surface, a contact bar and cam follower that are held against the cam by adjustable weight tension, a scale and microscope. A linear scale, engraved on the contact bar, is graduated from 0 to 3 inches in 50 thousandths of an inch. The microscope enlarges these divisions, each 50 thousandths can be divided so that direct readings can be made to .0005-inches and movements as small as .00025-inches can be easily and accurately estimated. The device is manufactured by F. T. Griswold Manufacturing Co. For descriptive bulletin and more details write DIESEL PROGRESS, File 95, P.O. Box 8458, Cole Station, Los Angeles 46, California.



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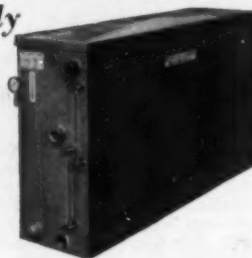
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Book on Water Treatment

"Water Treatment for Industrial and Other Uses" by Eskel Nordall. Published by Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y. 525 pages. \$10.00. This volume provides an exhaustive, practical and up-to-date reference work on the conditioning and treatment of water supplies for industrial and domestic uses. It deals with their impurities (chemical compounds, suspended solids, color, odor, taste, etc.) and the methods of treatment to fit them for a great variety of commercial and other uses. The eighteen chapters include current water treatment practices, problems relating to boiler feed waters and cooling waters, processes and equipment used in treating water, water softening processes, chemical reactions and methods of analysis. The volume also includes extensive tables of conversion factors and equivalents and other valuable tabular data.

The author, Eskel Nordell, has spent over 32 years in the water treatment field and brings to this book his experience in laboratory, office, plant and industry-wide field work. A chemist by training, he has actively worked in such fields as ceramics, plastics, rubber, dairy, textile, oil and gas, pulp and paper, laundry, municipal and engineering, etc., all of which are covered in his book.

Assistant Sales Manager



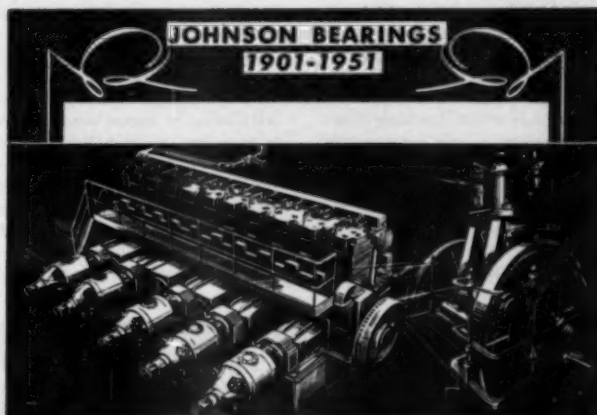
Charles W. Potthoff has joined Stewart & Stevenson Services, Inc. of Houston as assistant manager of the parts department. Joe Manning, general manager, has announced. Before joining the Stewart & Stevenson staff, Mr. Potthoff was with the Parts Association in Cleveland, Ohio. Previous to that he was in the parts department of the Dow Motor Company in Houston for 19 years. Mr. Potthoff has attended the General Motors parts school specializing in parts merchandising.

New Small German Diesels

In order to meet the increasing demand for small diesel engines of high speed, Motoren-Werke Mannheim, Mannheim, Germany has included in their production program a new series KD 11 diesel engine which is built in a one and two cylinder type ranging from 5 to 17 horsepower at a speed of 1250 to 2000 rpm. These machines have been introduced to the European market two years ago and having proven satisfactory they are now being offered on the U.S.A. market on short delivery terms. The complete diesel engine production line of MWM Motoren-Werke Mannheim comprises diesels from 5 to 950 horsepower. United States representatives of this German company are Ernest L. Frankl Associations, 22 East 40th Street, New York 16, N. Y.

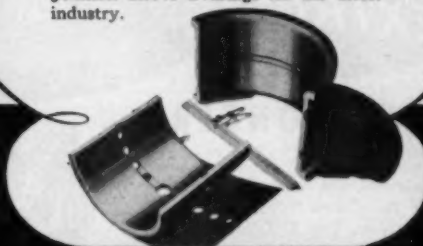
DIESEL ENGINE CATALOG is now available in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. **ORDER COUPON ON PAGE 79.**

NOVEMBER 1951



Progress in Diesels Required Progress in Bearings

CLOSE cooperation on design has been carried on for years by Johnson Bronze and diesel manufacturers. The tremendous advancement in diesels since 1901 and the need for wider application of diesel power has required much research and study of sleeve bearing materials and design. Load, shock, speed, temperatures, corrosive conditions and other service considerations have been studied thoroughly by Johnson engineers. This close relationship has resulted in today's efficiency and dependability in Johnson Sleeve Bearings for the diesel industry.



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Expansion Program

A \$1,000,000 building expansion program to increase production facilities of the Detroit Diesel Engine Division of General Motors is announced by W. T. Crowe, General Manager. The announcement highlights a production figure of over 50,000,000 horsepower in 2-cycle diesel engines attained by the Division since 1938. According to Mr. Crowe, this is the eighth major expansion the Division has made and adds almost 80,000 sq. ft. to the 1,000,000 sq. ft. now under cover. The Division's production to date of 2-cycle diesel engines for use in trucks and buses and in the construction, industrial, marine, petroleum and mining fields is now nearly two and a half times as great as the

total diesel horsepower presently being used on American railroads.

Rehabilitation of Erie Railroad

Rehabilitation of the century-old Erie Railroad under a \$70,000,000 program which will make it the first major line operating between New York and Chicago to become completely dieselized will be completed in 1952. Erie President Paul W. Johnston of Cleveland, told industrial executives and traffic managers of Lockport, New York, at a luncheon sponsored by The Upson Company, manufacturer of technical and industrial boards and fibre tile. Mr. Johnston and nine other executives and representatives of the Erie from Cleveland,

New York, Jersey City and Buffalo made a special trip to Lockport to inspect the carrier's yards and equipment and to meet with representatives of industries using the Erie's Buffalo-Lockport branch.

To date, the Erie has invested \$60,000,000 in its dieselization program and more than \$9,000,000 will be required to complete the project. President Johnston told Lockportians. He pointed out that at the present time, 94 per cent of the Erie's freight tonnage is moved by diesels. Another "first" also will be chalked up by the 100-year-old line. Mr. Johnston said in making the first public announcement of the Erie's plan to install two-way radio communication between locomotives and cabooses and train dispatchers at adjoining way stations on the main line. The president said the Erie will become the first major railroad in the nation to have complete two-way communication. He reported that the first installation was completed in Indiana early in September.

Traction-Motor Change-Out Speeded



Change-out of traction motors on diesel units are speeded up with the use of the new connectors manufactured by Paxton-Mitchell Company. Because of the new design of these Williamsgrig connectors, the manufacturer states that taping and untaping cables and the maintenance of glad hands at every change-out is no longer necessary. In addition, only a 1/4 turn of the buttress thread nuts are required to tighten cable connections. The terminal block on the connectors is made of neoprene to assure proper insulation of terminal connections in all kinds of weather. The terminal connections are made of a special alloy copper to assure the highest conductivity of electrical current. They are designed to assure equal contact pressure over the entire mating surface of each connector and also provides for a tensile pull of 1500 pounds. Another feature, according to the company, is that connectors which become damaged may be renewed without replacing the complete block. Tests conducted by the maker show that they perform satisfactorily regardless of ice, snow or other extremes in weather conditions. For further information, write DIESEL PROGRESS, File 93, P.O. Box 8458, Cole Station, Los Angeles 46, California.

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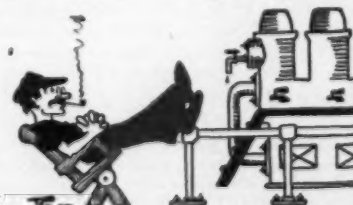
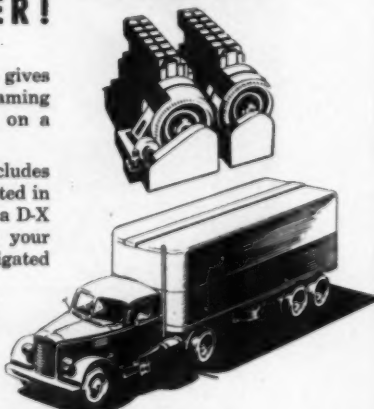
Waterloo, Ia.

Terre Haute, Ind.

Omaha, Nebr.

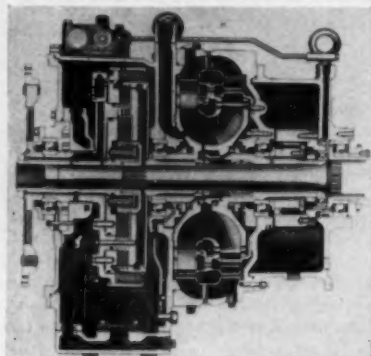
Chicago, Ill.

Minneapolis, Minn.



DIESEL PROGRESS

Twin Disc's Torque Converter



The new Model DF Twin Disc Hydraulic Torque Converter for off-highway applications. One secret of the converter's success is the stationary set of reactor blades.

Development of a three-stage hydraulic torque converter transmission, which it is claimed, eliminates 99% of forward gear shifting on the toughest grades, and which, combined with engine drag, can perform 90% of the braking, has been announced by the Twin Disc Clutch Company of Racine, Wisconsin. Successfully tested under the grueling hauling requirements on the Mesabi Iron Range, the new unit is known as the Twin Disc Model DF Direct Drive Hydraulic Torque Converter. The new converter, used with closely spaced transmission, provides smooth and efficient use of power for trucks which haul loads up to 30 tons on grades up to 13%, field tests indicate. The converter is actually a compound unit made up of three major assembly groups; the oil actuated clutch group, the basic torque converter and the freewheel assembly. Hydraulic braking is provided in a smooth and effortless manner merely by moving the control valve to the braking position. This is normally done when the converter is operating in direct drive. In this position, the control valve spool uncovers both the direct mechanical drive clutch ports, thus driving the converter, direct drive shaft, and engine at a common speed resulting in maximum braking effort. Part of this braking effort is in the form of engine drag; however, the braking effort is substantially increased due to absorption of the braking load by the torque converter system. Thus total braking is made up of the resistance offered by engine drag and energy absorbed by the converter impeller.

N. Y. Central Orders Diesels

The New York Central Railroad has announced that it has placed orders for 261 units of diesel-electric motive power to cost approximately \$35,000,000. Of the total, 237 units are for New York Central service and 24 for its affiliated Pittsburgh & Lake Erie Railroad. The order consists of 64 road freight units, two road passenger units, 148 yard switchers and 47 road switchers. Delivery of the new locomotives is expected to begin in the second quarter of next year and to be completed early in 1958. They will increase the diesel-electric ownership of the New York Central and affiliates to 1,915 units with a total of 2,446,100 horsepower.

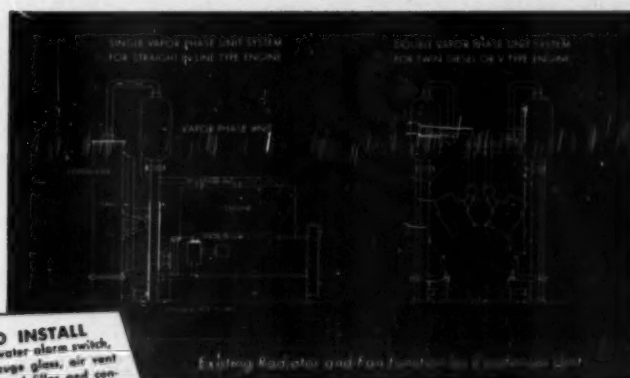
The locomotives will be constructed by the Electro-Motive Division of General Motors Corp.; the

American Locomotive Co.; Fairbanks, Morse & Co.; and Baldwin-Lima-Hamilton Corp. Orders placed with each manufacturer for New York Central's ownership are: Electro-Motive Division: thirty-two 1,500-hp. road freight "A" units; thirty-two 1,500-hp. road freight "B" units; forty 1,200-hp. yard switchers; twenty 800-hp. yard switchers. American Locomotive Co.: thirty-five 1,600-hp. road switchers; forty-three 1,000-hp. yard switchers. Fairbanks, Morse & Co.: seventeen 1,200-hp. yard switchers. Baldwin-Lima-Hamilton Corp.: eighteen 1,200-hp. yard switchers. Orders for the Pittsburgh & Lake Erie Railroad are: Electro-Motive Division: twelve 1,500-hp. road switchers; ten 1,200-hp. yard switchers. American Locomotive Co.: two 2,250-hp. road passenger "A" units.

Elected Vice President

Election of James H. Ingersoll as vice president of the Ingersoll Products Division of Borg-Warner Corp. has been announced. He previously was assistant to the president of the division. Mr. Ingersoll started with the company in 1937, working on factory jobs during the summers between school years. He was on leave of absence from 1942 to 1945 while serving in the United States Navy as Lieutenant. Since 1945 he has been at the Ingersoll plant in Chicago in various capacities, including those of staff engineer, cost reduction engineer, manager of the rolling mill and farm implement division. He is a graduate of Choate School and of Dartmouth College.

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KONA LIGHT AND POWER AT KEALAKEKUA

By W. E. ZERBE

WHEN that famed traveler of song goes back to his "Little Grass Shack in Kealakekua, Hawaii," it's ten to one that that "Grass Shack" will be served by the Kona Light & Power Co., Ltd. at Kealakekua. Kona Light and Power Co. started serving the "Kona Coast" area in February 1932 and has been growing steadily ever since. Besides being well known in song for that little fish with the big name, the Humuhumunukunuuapua, the area is the center of the coffee plantations raising the world-famed Kona coffee, and is also a center for both commercial and sport fishing, and is also a tourist center. It was near Kealakekua that Captain Cook first landed in the islands.

At present there are approximately 5000 acres of coffee plantations, and the industry is growing steadily. Kona coffee has its own very special delicious flavor. Unlike coffee grown in other areas, it is grown in the open without the necessity of shade trees. It is well known that ordinarily coffee must be shaded from the intense tropical sun, but along the Kona Coast, nature takes care of the problem automatically and shade trees are not required. In the earlier part of the day, the sun shines brightly, but later cumulus clouds form over the area and create a natural "lath house," which reduces the sun's intensity to the point where shade trees are unnecessary.

The ocean abounds with swordfish, tuna, barracuda, mahimahi and giant pompano, which run to 100 lbs. as compared with ordinary pompano at about 10 lbs. Tuna and swordfish form the basis of an active commercial fishing industry, requiring refrigeration all year around, which forms a steady base load for the power company. The town of Kailua is the home of the famed Kona Inn, which is well known to all tourists who have visited the island. Many people who have visited this area have found it an ideal place for retirement and many "grass shacks" have been built on a deluxe scale for those who love the easy way of living in this area.

Starting with a small 50 kilowatt diesel generator set, the plant has gradually grown with the addition of individual 100 kilowatt sets. In 1947 the plant capacity was more than doubled by the installation of a 300 kilowatt, 45 hp., Fairbanks-Morse model 32E14 generator set to take care of the increased loads. Two years later a duplicate 300 kilowatt Fairbanks-Morse model 32 generator set was installed to handle the greater increase in load created by rapid post-war growth. The power company now serves a total of approximately 2000 meters in an area of approximately 200 square miles. The plant has an exceptionally high load factor created by practically an even balance be-

tween daytime commercial load and night time domestic load. The two 300 kilowatt sets furnish the base load capacity and operate heavily loaded in their best fuel economy rates at all times. The older 100 kilowatt and 50 kilowatt sets act as standby and for peak loads only. The plant is now rapidly reaching the limit of its total of 900 kilowatt installed capacity.

Cooling was a problem. Evaporative cooling systems, such as cooling towers or evaporative coolers, cannot be used because of extremely high humidity. The area is subject to frequent tropical rains. The final solution was the installation of large radiators with individual motor driven fans. One or more units are operated as required, according to load. Ambient air temperatures seldom exceed 85 deg., and since radiators are not particularly affected by extreme humidity, the cooling system is extremely dependable.

Maybe some day someone will figure out a way to tap the underground fires of that spectacular volcano, "Mauna Loa," which persists in violently shaking up the island and spilling lava at frequent intervals. This would be an extremely handy arrangement for the Kona Light & Power Co. Until that time, however, they will keep on expanding their diesel plant as the area served grows.

Sweeney
POWERENCH TOOLS

for diesel engine maintenance



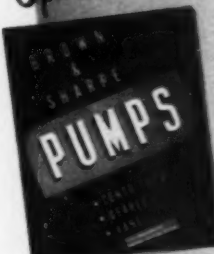
SWEENEY RIDGE GRINDER removes the ridge in less than three minutes from chrome or cast iron cylinder liners... Grinds true to worn contour of liner. Fits 7 1/2" to 16" I. D. cylinder liners.

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Appointed Sales Engineer

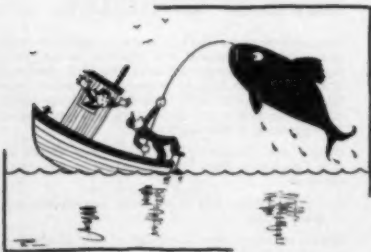


Bruno V. Nordberg III Appointment of Bruno V. Nordberg as sales engineer, four-cycle engine department is announced by R. W. Bayerlein, vice president, Heavy Machinery Division, Nordberg Manufacturing Company, Milwaukee 7, Wisconsin. A native of Wisconsin, Nordberg is a grandson of the founder of Nordberg Manufacturing Company, Bruno V. Nordberg and son of Bruno V. E. Nordberg who was executive engineer of this company at the time of his death in 1946. Mr. Nordberg graduated from Marquette as a mechanical engineer in 1944 and after two years of naval service in an engineering capacity, was discharged in 1946. In that year he joined Nordberg and was assigned as a test and erection engineer in the Heavy Machinery Division. He was later transferred to engineering installation, a position he retained until his recent appointment.

Concentrates Locomotive Manufacture

Baldwin-Lima-Hamilton Corporation, Eddystone, Pa., has announced that, on or about January 1, 1952, the sales, engineering and manufacturing activities of The Whitcomb Locomotive Company, a wholly-owned subsidiary located at Rochelle, Illinois, will be transferred to the Eddystone, Pennsylvania plant. The contemplated transfer represents a broadening and strengthening of Baldwin-Lima-Hamilton's position in the field by concentrating all locomotive manufacture in the Eddystone Plant where ample facilities are available. This consolidation of product manufacture is in line with the company's policy of integrating the various components in the company to insure more efficient and economical operation.

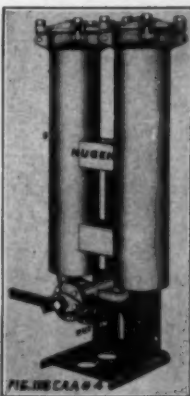
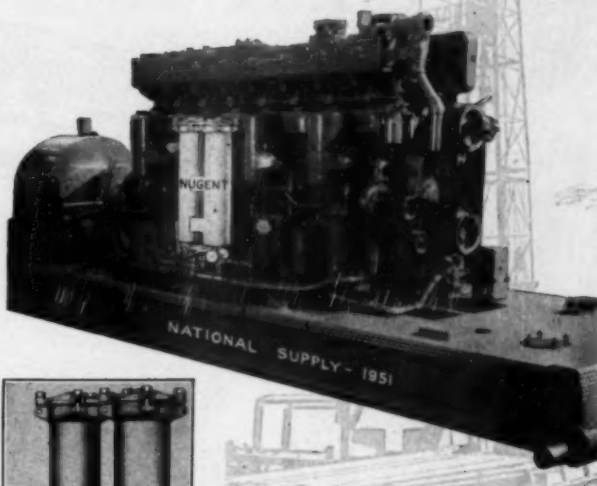
The Whitcomb Plant, at Rochelle, will be utilized to provide much needed space for the expansion of the manufacturing activities of the Austin-Western Company, also a Baldwin-Lima-Hamilton subsidiary, whose principal plant at Aurora, Illinois, is taxed to capacity by the demand for its many types of road-building and material handling equipment. Until further notice the activities of the Whitcomb Locomotive Company and the channels for handling inquiries and orders for its products will continue as at present. Ample notice will be given to Whitcomb's many customers, and supplementary announcements will be issued to the press, before the final transfer is made.



NOVEMBER 1951

NUGENT Full-Flow FILTERING...

...lengthens diesel engine life
...increases engine dependability



Illustrated above is one of several National Superior diesel powered drilling rigs for American Arabian Oil Company equipped with Nugent Full Flow Filters of the type shown.

NUGENT Full Flow Filtering of lube oil is the practical way to provide a maximum of lubrication protection for vital engine working parts. With Nugent Full-Flow Filtering *all* the oil being circulated through the engine is filtered every cycle. Dirt, carbon and foreign matter are removed as soon as they get into the oil. No oil bypasses the filter, because it is the foreign matter in by-passed oil that does the damage.

Nugent Full Flow Filters are made in a complete range of sizes for all sizes and makes of diesel engines. They utilize inexpensive replaceable bag-type charges having 20 times the filtering area of other filters of comparable size.

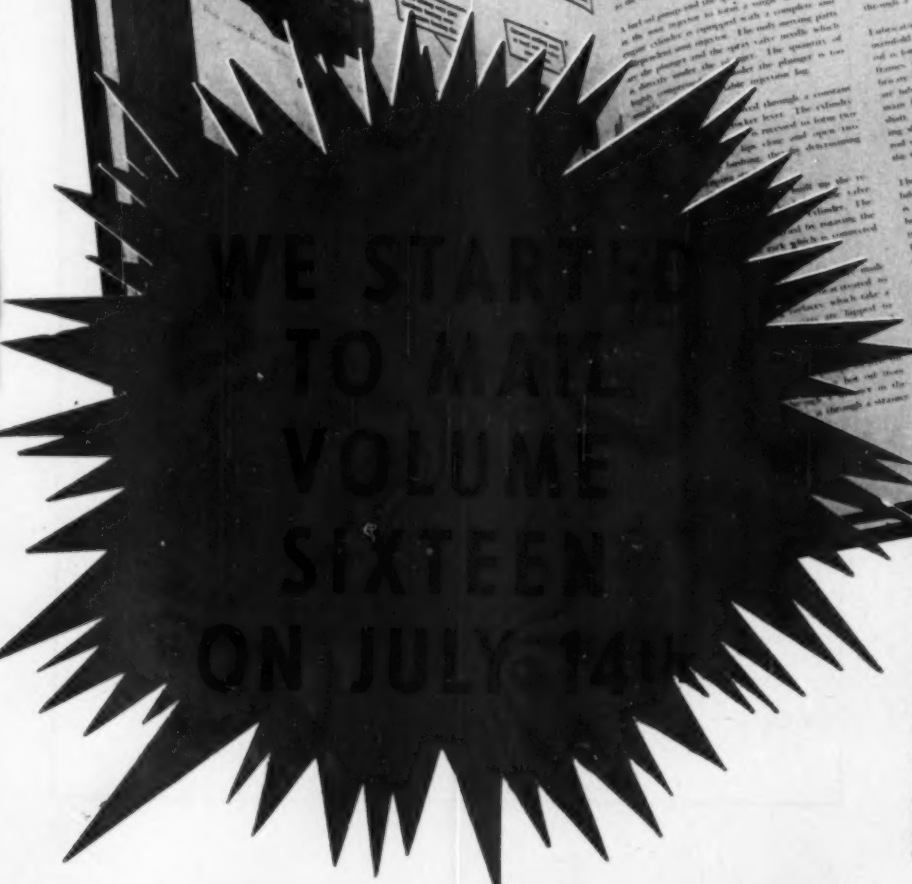
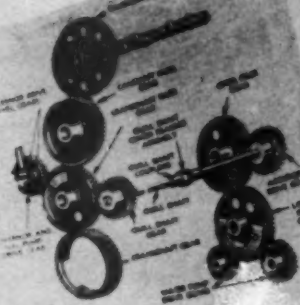
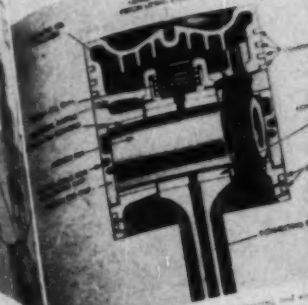
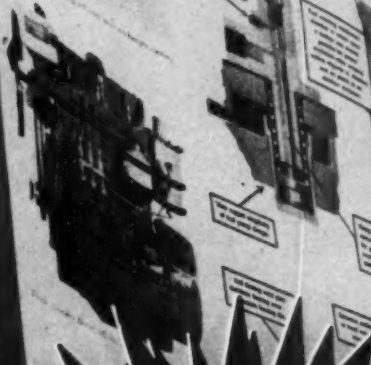
To get maximum dependability and useful life from your diesel engines, you can't afford to be without Nugent Full-Flow Filters. Write for complete information.



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415 N. Hermitage Ave. CHICAGO 22, ILLINOIS

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DIESEL ENGINE



WE START
TO MAIL
VOLUME
SIXTEEN
ON JULY 1941

REVISED ANNUALLY.

This comprehensive book is brought up-to-date every year. Carefully revised and checked by the manufacturers themselves, its complete and profusely illustrated data include numerous changes, new types and models and re-designs with up-to-the-minute information on diesel and dual-fuel engines manufactured in this country.

Design and Consulting Engineers keep Diesel Engine Catalog at hand for easy reference throughout the year.

Product Engineers find its accurate, easy-to-find data of great value.

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Technical Instructors and Students consult it as an unsurpassed reference book.

ENGINE CATALOG

ENGINES LISTED AND DESCRIBED IN VOLUME 16

ABOE

American Locomotive

Anderson O'Brien

Atlas Diesel Engine

Baldwin-Lima-Hamilton

Buda

Burmeister & Wain

Caterpillar

Chicago Pneumatic

Clark Bros.

Cleveland Diesel

Consolidated Diesel Electric

Continental

Cooper-Bessemer

Crofton

Cummins

Deere

Detroit Diesel

Electro-Motive

Enterprise

Fairbanks-Morse

Fulton

Graymarine

Hallett

Harnischfeger

Hercules

Hill

Ingersoll-Rand

International Farmot

International Harvester

Lathrop

Lister-Blackstone

Mack

Massey Harris

Murphy

Nordberg

Oliver

Palmer

Rathbun-Jones

John Reiner

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Venn-Severin

Washington Diesel

Waukesha

White-Roth

Witte

Worthington

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IN NO OTHER BOOK can be found such complete and detailed information on diesel engines and accessories. Rewritten in its entirety while being brought up-to-date, great attention has been given to make Diesel Engine Catalog an easy-to-read book. Its comprehensive classification and indexing contribute to making any item easy-to-find.

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- (a) An engine section fully illustrated with complete technical descriptions and specifications.
- (b) An accessory section describing engine and plant accessories.
- (c) A transmission section describing torque converters, etc.
- (d) A classified buyers' guide — "Market Place," covering Diesels, accessories, transmissions and other allied products.
- (e) A large advertising section. Manufacturers' advertisements carry a wealth of information for design and purchasing engineers.

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DIESEL PROGRESS

P. O. Box 8458, Cole Station, Los Angeles 46, Calif.

Enter my order today for a copy of the Diesel Engine Catalog, Volume Sixteen, Edited by Rex W. Wadman, for which I enclose \$10.00. (Copies may be ordered in the Sterling Areas by remitting £4/0/0 to E. H. Doddrell, 342 St. Paul's Corner, Ludgate Hill, London, E.C.4.)

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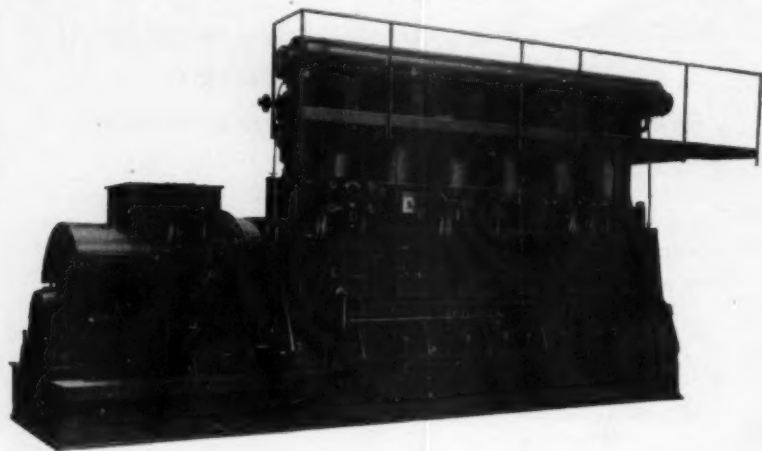
Selected For International Technical Conference

Three papers dealing with "Shell Side Characteristics of Shell and Tube Heat Exchangers," written by Townsend Tinker, Buffalo, were preprinted for presentation and discussion at a conference of leading North American, English and European technical societies in London, England, September 11 to 13. Mr. Tinker's papers were selected on invitation of the



Townsend Tinker

Joint Committee on North American Participation in the international discussion of outstanding developments in the various fields of heat transmission during the past decade. For the past 16 years, Mr. Tinker has been chief engineer of Ross Heater & Mfg. Co., Inc., Buffalo, N. Y., a division of American Radiator and Standard Sanitary Corp. Widely known for his many contributions to the advancement of heat exchangers, particularly his papers presented before the American Society of Mechanical Engineers, of which he is a member, Mr. Tinker has been acclaimed also for his editing of the T.E.M.A. Standards, Second Edition, published by the Tubular Exchange Manufacturers Association, a group of 12 leading heat exchanger manufacturers of which Ross is a member.



UNION, in 1885, built the world's first successful liquid-fueled internal combustion engine • The **UNION** airplane engine was the first to meet endurance requirements of the United States Aeronautics Testing Laboratory • A **UNION** was the first American-manufactured, exhaust-gas, supercharged, heavy-duty Diesel engine • **UNION** Dual Fuel Engines are used where simplicity, dependability and economy are paramount • Two **UNION** engines and an assembly which illustrate outstanding developments are on exhibit at the Smithsonian Institution in Washington, D. C.

*Only **UNION** has been manufacturing quality internal combustion engines for more than 66 years*

UNION DIESEL

2121 DIESEL STREET, OAKLAND 6, CALIFORNIA, U.S.A.

Railroad Dieselization

A recent report of the I.C.C. shows the rapid strides being made in the dieselization of the nation's railroads. As of September 31, 1950 there were in service 25,640 steam locomotives, 788 electric locomotives and 14,047 diesel-electric locomotives, of which 96.6 per cent had been built since 1940. Only 12 of the steam locomotives in service at the close of the year were built in that year, in comparison with the 12 electric units and 3,170 diesel-electric units.

Taylor Dynamometer Bulletin

The Taylor Dynamometer and Machine Company, 528 West Highland Avenue, Milwaukee 3, Wisconsin, has announced the issuance of its new two-color bulletin No. 181. The bulletin covers their "HIEFF" line of sensitive precision drilling machines. The bulletin, containing complete specifications and pictures, covers all modifications recently made in the equipment. Specifications cover both Series A and B drilling machines. Bulletin 181 is available upon request to the company.

Magnus Chemical Announces New Product

The Magnus Chemical Company, Inc. announces the development of a new product, Magnus Kling-Oil, a general purpose machinery oil having the unique feature of metal adhesiveness. It is tacky and clings tenaciously to the moving parts of machinery. Because Kling-Oil "stays" longer than conventional oils it reduces the number of oilings required—often by as much as five times. Because there is less drippage and spattering it promotes safer and cleaner shop conditions. The tackiness property of Kling-Oil is not affected by the rubbing action of machinery. No gumming or build-up is experienced after continued use.

Kling-Oil has an SAE-30 viscosity and may be used anywhere that such oils are used and applied by the same methods. Where oil is applied by a circulating system, Kling-Oil may be used satisfactorily but no advantage should be expected. Further information can be obtained by writing to the Magnus Chemical Company, Inc., Department DP-117, Garwood, New Jersey.



Fourth Edition of "Standard Practices"

"Standard Practices for Stationary Diesel Engines," published by Diesel Engine Manufacturers Association, One North LaSalle Street, Chicago 2, Illinois. 197 pages, \$5.00. "Standard Practices" is the work of an outstanding committee of engineers whose every-day work in the factory and in the field qualifies them to write authoritatively on diesel engine construction, rating, selection, installation, fueling, lubrication, cooling, performance and operation. The book is published in the interests of removing "some of the misunderstandings . . . which are due to lack of definition of terms and practices, and to thereby promote a more intelligent agreement between the buyer and the seller." Refinements, new developments and changing procedures have led to this, the fourth edition. Like its three forerunners its sole aim is to be of service to diesel engine users, prospective buyers and consulting engineers. It covers stationary diesel engines at speeds up to and including approximately 750 revolutions per minute and supersedes all previous editions. Comprising nineteen chapters the volume covers a wealth of essential information.

Retires as Chief Engineer



Edwin C. Beck

D. M. Hesling, director of research and engineering, Sealed Power Corporation, has announced the retirement of J. Howard Ballard as chief engineer and the promotion of Edwin C. Beck to this position. Mr. Ballard has long been recognized as one of the leading piston ring engineers in the automotive industry and had been associated with Sealed Power since 1929, having been chief engineer for the past fifteen years. He has been granted numerous patents on piston rings and other automotive products. Mr. Beck, a graduate of Massachusetts Institute of Technology, joined Sealed Power in 1934 as a sales engineer in Los Angeles. In 1937, he was assigned to the engineering staff in Muskegon, and in 1942, was advanced to the position of manager of the Detroit office contacting original equipment customers. Mr. Beck is a member of the Society of Automotive Engineers and the Engineering Society of Detroit.

Executives Re-Assigned



W. R. Leopold



D. L. Gallagher

Mr. W. R. Leopold, assistant to the vice president, has been appointed to direct operations of the Public Works Division of Worthington Pump and Machinery Corporation, Harrison, N. J., according to an announcement by Mr. T. Cruthers, sales vice president. Mr. D. L. Gallagher has been ap-

pointed manager of the division. Mr. Leopold started with Worthington in 1917 as a sales trainee in the meter shop in Harrison and subsequently became a meter salesman, assistant sales manager of the Chicago office, Western manager of the railroad division and manager of the Detroit office. Last year he was appointed assistant to vice president Cruthers. Mr. Gallagher was graduated from Rensselaer Polytechnic Institute in 1930 with an M.E. degree. After seven years with the New York Power and Light Corporation, he joined Worthington as an application engineer in the compressor division of the Buffalo plant. He acted successively as an application engineer in the Reciprocating Pump Division at Harrison, a sales engineer in the Marine Division and then the Public Works

Division. Since 1950, he has been assistant manager of the Public Works Division.

Two Allis-Chalmers Appointments

Walter Winzig has been assigned to Allis-Chalmers Houston district office as a water conditioning sales representative. Mr. Winzig is a mechanical engineering graduate of Marquette University and has been associated with Allis-Chalmers since 1949 and has completed the company's graduate training course. Al Matthiesen, formerly an assistant engineer in Allis-Chalmers turbo-power development and steam turbine departments, has been named a sales representative in the company's Washington, D.C. district office.

EATON VALVES for DIESEL ENGINES




For more than 30 years Eaton has been privileged to cooperate with the country's leading Diesel engine builders in furnishing valves and other valve train parts. These engine manufacturers have found that Eaton's broad experience in the Diesel engine field and Eaton's understanding of the problems peculiar to Diesel engineering, are as valuable to them as the quality of the valves produced.

Eaton engineers will welcome the opportunity to discuss the application of Eaton valves to engines now in design or in production.

EATON MANUFACTURING COMPANY

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VALVE DIVISION: 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

 **PRODUCTS:** Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings • Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamic Drives, Brakes, Dynamometers

New "Alnor" Pyrotac

A new type of instrument is now available to operators of stationary diesel or gas engine plants. This instrument is known as the "Alnor" Pyrotac. Technically it can be described as an indicating, contact making pyrometer and is available either as a single circuit instrument or with a motor operated selector switch. Its existence opens many new opportunities for improving the instrumentation of a diesel or gas engine plant. It might, for instance, be used to sound an alarm and automatically shut down the engine in case of an excessively high exhaust gas temperature for any one cylinder. It is being used in this manner in several large installations of Nordberg radial type engines. On these installa-

tions the instrument is connected in turn to the thermocouple in the exhaust stem from each cylinder once every minute. Should the exhaust temperature of any one cylinder be above the pre-determined maximum the alarm will sound and the engine will be shut down. The pointer on the selector switch will stop at the number of the offending cylinder thus facilitating the location of the source of trouble.

The automatic features of the Pyrotac and motor operated switch do not in any way interfere with the customary use of an exhaust temperature pyrometer. By merely watching the pyrometer pointer for a period of one minute, the operating engineer can determine if one or more cylinders are out of

balance. Because the switch is of the overlapping type (i.e., the new thermocouple is connected before the old thermocouple circuit is broken) the pyrometer pointer does not drop then to ambient temperatures between readings. Therefore, an out of balance condition is indicated by an appreciable motion of the pointer. If the engineer desires to log the exhaust temperature of each cylinder, he can stop the selector switch at any desired cylinder by pressing a spring loaded button on the meter panel and then read the temperature. Releasing the button puts the instrument back in service continuously protecting the engine. In those plants where it is impractical to shut an engine down because of excessive exhaust temperature, the alarm feature can be used to advantage to warn the engineer of the dangerous conditions so that he can take the necessary steps to protect his equipment.

The Pyrotac could, of course, be used for other purposes. In a multiple engine plant it might be connected to a couple in the common exhaust of each engine and thus sound an alarm if any one engine were overloaded. An instrument with a suitable temperature range could be connected to couples installed in each main bearing in an engine to sound a warning of overheated bearings. Similarly a Pyrotac with a suitable range could be connected to the thermocouples which are so commonly built into the field of large generators and thus warn of excess heat and the danger of a burn-out. For those installations which do not have a multiplicity of temperature zones all having the same maximum safe temperature, the single circuit pyrotac can be used to advantage. Since the Pyrotac is quite low in cost compared to the value of the equipment it is protecting, it can be used quite freely. For instance, a single engine plant can use one to advantage to indicate the temperature of the combined exhaust and sound an alarm if overloading occurs.

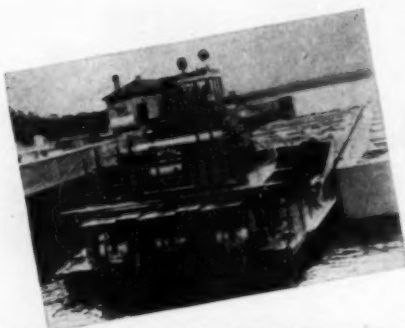
The Pyrotac is simple and rugged, and built for years of service. The meter movement is the same husky unit that has made "Alnor" Pyrometers so popular in the gas and diesel engine plants. The contact making mechanism is non-electronic—no "tuning" adjustments are required. The motor operated switch is a comparatively radical design, but it has now had years of field use with complete satisfaction to the original purchaser.

Diesel Plant Conference

The second annual conference for diesel plant operators, engineers and superintendents was held at the University of Missouri, Columbia, Missouri, this past month. The conference ran for three days. Experts from the diesel industry and faculty members lead discussions on engine problems including crankcase explosions, dual fuel, and engine water treatment, lubrication and filter problems, and preventive maintenance for both engines and electrical gear. A half-day session was devoted to a fuel injection servicing clinic with actual bench tear-down demonstrations. All sessions were concerned with the practical aspects of operation and maintenance.

DIESEL ENGINE CATALOG is now available in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 79.

BIG TOW CUTS COSTS with OUTBOARD'S HEAVY DUTY POWER



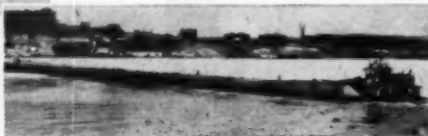
The "Cartasca," powered with three Model 0-7, 300 H.P. Harbormaster Units, has been operating successfully since 1946.

HARBORMASTER UNITS on the big tow "Cartasca" demonstrate again the low operating cost, easy maneuverability, and heavy duty power achieved with outboard propulsion.

The "Cartasca" is Cargill Grain Co.'s 597-foot integrated tow, built to carry 6,000 tons of grain . . . and in successful river operation with Harbormaster Outboard Propulsion And Steering Units ever since 1946. It's powered with three 300 H.P. Harbormaster Units; and in addition the "Cartasca" carries a smaller Harbormaster unit of 165 H.P. that is located in the bow. This bow unit is controlled from the pilot house, is used for steering only, and is particularly valuable in working the tow through locks.

Maintenance costs have been exceptionally low on the "Cartasca". Here again Harbormaster has demonstrated the advantages of outboard propulsion, and the outstanding efficiency of Harbormaster Outboard Propulsion And Steering Units.

Send for Harbormaster Catalog (over 70 photos and diagrams) that explains advantages of outboard power. Write today.



Murray & Tregurtha
HARBORMASTER
Outboard Propulsion
And Steering Units

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Please send catalog, without obligation, covering the Harbormaster Outboard Propulsion And Steering Unit.

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Outboard Propulsion . . . Heavy Duty Power With Outboard Maneuverability

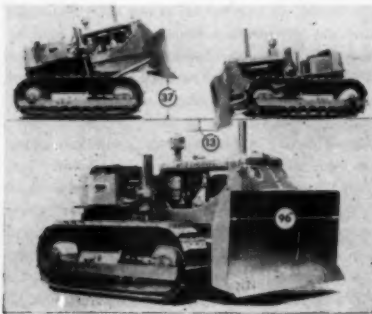
New Oil Filter Plant

Fram Corporation, manufacturer of automotive oil filters, officially opened its million-dollar, ultra-modern new filter plant at Greenville, Ohio, with a two-day open house for jobbers, distributors and auto manufacturers from 15 states, and for residents of Greenville and vicinity. Visitors watched complex production lines manned by 430 employees spin out oil filters and replacement cartridges at the rate of 40,000 per day. The new Fram plant is 600 feet long and 200 feet wide, with a two-story center section of 30,000 square feet. The entire plant provides 130,000 square feet of working space. It is constructed entirely of brick, steel and glass. When working at top production, the plant will employ 650 people and turn out 12,000 filters and 40,000 cartridges per day.

More Diesels For "Soo Line"

Minneapolis, St. Paul & Sault Ste. Marie Railroad, known as the "Soo Line," is going to purchase 20 additional diesel-electric locomotives at a cost of about \$3,250,000. When these new locomotives get into service, the "Soo Line" will have about 75% of its power equipment dieselized.

Big Capacity No-Pushbeam 'Dozer



Development of a successful big-capacity, no-pushbeam bulldozer, long the dream of the earthmoving machinery industry, has been announced by the Baker Manufacturing Company of Springfield, Illinois. Design, development and field proving of the revolutionary product was carried on in close cooperation with the Allis-Chalmers Manufacturing Company, Tractor Division, for whose complete line of crawler tractors, Baker manufactures matching standard bulldozer, graders and root rippers. The addition to the line extends the range and versatility of big, heavy-duty bulldozers because it can be hauled freely on the highways, day or night, without special permits.

Designated the 9-X, this new dozer, by the elimination of pushbeams mounts 8-foot wide blade on the 70-drawbar hp. 9-ton Allis-Chalmers HD-9 tractor. Incorporating the Baker "roll-action," this narrower blade has approximately the same total blade area and capacity as the conventional 9-foot 6-inch model for the HD-9 tractor. The 9-X is of special interest to dirt moving contractors having frequent occasion to move equipment from job to job, and particularly where it is desirable to change

locations overnight when special width permits are not available. On the 9-X, the dozer frame and tractor frame are bolted together as an integral unit. Thus the tractor frame itself becomes the pushbeam. The tractor-dozer is raised and lowered as an integral unit by double-acting hydraulic cylinders connecting to the truck frame through a new lifting mechanism. In mounting the 9-X, the front spring and saddle are removed and the spring pads are replaced by special brackets to which the lifting mechanism is attached. This mechanism is so designed that the only forces of any consequence entering the truck frame are vertical forces, which are adequately designed to absorb at identically the same points as such forces are applied in the standard dozer mounting, in the form of a spring load.

The blade, with positive instantaneous action up or down, has a maximum rise of 37 inches and a drop below ground of 13 inches. The center of gravity of the 9-X mounted tractor remains well back of the second roller regardless of blade position, assuring maximum traction under all conditions. Complete details on specifications and performance characteristics are provided in Engineering Bulletin No. 896-A available from all Baker, Allis-Chalmers dealers or direct from The Baker Manufacturing Company, Springfield, Illinois.

DIESEL ENGINE CATALOG is now available in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. **ORDER COUPON ON PAGE 79.**

NEW

continuous protection for your diesel engine

The new Alnor Pyrotac brings you the constant protection you've been wanting for your Diesel engine—an instant check of all cylinder temperatures, at a glance.

This precision-built instrument continuously monitors exhaust temperatures... automatically checks each cylinder every minute. Watching the pyrometer scale from as far away as 20 feet, you can instantly tell if any one cylinder is out of balance... allows supervision by a minimum force. The instrument can be wired to an alarm circuit to warn of excess temperatures and automatically shut down the engine when maximum safe temperatures are exceeded. The pointer on the selector switch will stop at the number of the offending cylinder... exactly locating the source of trouble.

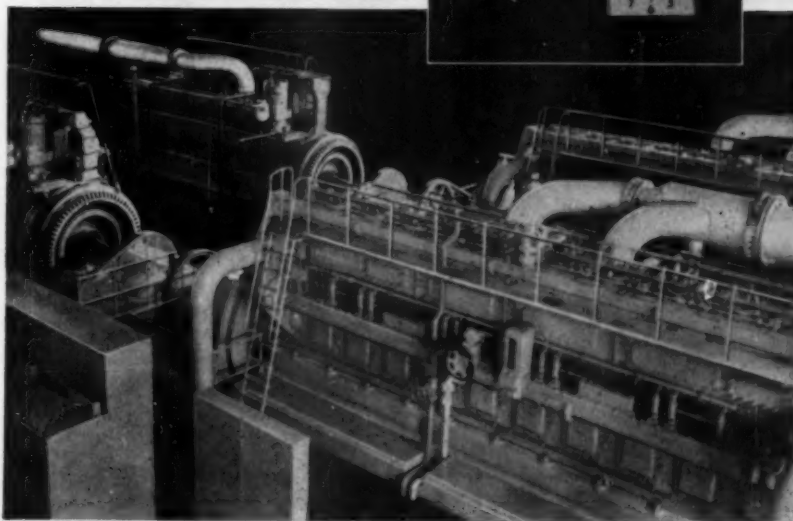
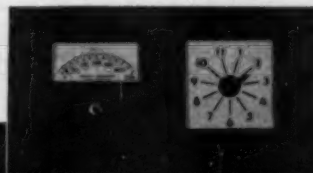
Such automatic, constant protection reduces maintenance time and expense to a minimum—increases efficiency and operating economy.

The Pyrotac presents many opportunities for improved instrumentation in the Diesel and gas engine field. It can be used to warn of excess temperatures in cylinders, entire engines, overheated bearings, burn-out danger in fields of large generators, etc. Why not ask for Alnor assistance in solving your pyrometer problems today? Illinois Testing Laboratories, Inc., Room 508, 420 N. La Salle St., Chicago 10, Ill.

THE ALNOR PYROTAC
available in several
multi-circuit models.

Alnor

PRECISION INSTRUMENTS
FOR EVERY INDUSTRY



Names Manager of Marketing Research



J. B. Laramy

Mr. J. B. Laramy has been appointed manager of the Marketing Research Department of Worthington Pump and Machinery Corporation, Harrison, N. J., according to an announcement by W. H. Feldman, vice president in charge of sales. Mr. Laramy has been assistant manager of Worthington's Chicago district office for the past six years. He is a member of the American Water Works Association. The post of assistant manager of the Chicago office has

been filled by Mr. J. T. Carroll. Mr. Carroll joined Worthington in 1931 and for the past three years has been regional distributor supervisor of the Air Conditioning and Refrigeration Division at Chicago, Illinois.

Assistant Treasurer

R. F. Schutz has been named assistant treasurer of the Ingersoll Products Division of Borg-Warner Corporation. Mr. Schutz joined Ingersoll in February 1944 as controller in the division's Kalamazoo, Michigan plant. He has also been in charge of contract sales, and for a time, he served as production manager. He was graduated from the University of Illinois in 1933.

Opens Factory Branch Store

Link-Belt Company announces that it has opened a new factory branch store at 108 South Fourth West Street, Salt Lake City 1, Utah, in order to better serve the mines, mills and factories in Utah, southern Idaho and eastern Nevada with their power transmission and materials handling requirements. The new store is headed by Donald W. Newcome, district manager, an engineer transferred from the company's San Francisco plant. He will be assisted by Harry Hotchkiss, who until recently was on the staff of the Link-Belt store and warehouse in Spokane, Washington.

Dehydrator for Diesel Fuels



Increased combustion efficiency, reduced carbon formation and less corrosion of working parts are claimed for internal combustion engines when using fuel dehydrated by this new unit. Dehydration is accomplished by passing the fuel through elements which are a combination of wound cellulose cylinders, especially treated coalescing media, perforated metal and glass cloth. There are no moving parts and with reasonable care the dehydrating elements will function indefinitely. Where there is a possibility of large volumes of water in fuel, a hydraulically balanced, automatic ejector is available as an accessory.

According to F. S. Ehrman, vice president in charge of lubrication and filtration sales, Bowser, Inc., Fort Wayne, Indiana, field tests have confirmed the high efficiency of this hydrator in removing free or entrained moisture from liquid fuel. Small quantities or unexpected large slugs of water were eliminated with equal ease. Available in capacities of 350 and 600 gpm. Maximum working pressure 125 psi. Shell and cover are heavy gauge steel, A.S.M.E. code labeled construction.

Indiana Distributor

Recently appointed exclusive distributor and representative in Indiana for the Koehring Company of Milwaukee, the A. E. Deaney Company of Indianapolis will handle the complete line of heavy duty construction equipment. In addition to the Koehring products, the firm also represents C. S. Johnson Company of Champaign, Illinois, and Parsons Company of Newton, Iowa, both Koehring subsidiaries. A. F. Deaney is president of the organization and Ralph Riddle is in charge of sales. The Deaney Company will cover the entire state of Indiana in the northwest corner and six border counties in the southeast. The Deaney Company office, sales and service departments are located at 719-721 North Pine Street in Indianapolis.

Sterling Viking Diesels definitely lower costs of power production



Model VDS-8S, 600 KW Generator Set. Viking Diesel "packaged unit" generator sets are available in 6 and 8 cylinder models. Bulletins 1024 and 1028 contain sectional views, fuel consumption curves, engineering and installation details. Sent on request.



We have the evidenced facts to show any user of diesel electric generator sets that the newly engineered Sterling Vikings can cut KW hour production costs as much as 50 per cent.

Fuel consumption, engine weight, compactness, housing, installation, parts cost, general maintenance—all are factors in the service

worth of a generator set. On every point Vikings offer proven advantages confirmed by comparison. In diesel engineering, Sterling has come up with design developments that have the industry talking. We would like to give you this story of lower power costs first hand. Write us for latest Sterling Viking Diesel literature.



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• Depend upon Sterling Diesel Power for Locomotives, Generator Sets, Commercial and Fishing Craft, Lift Bridges, Ventilating Systems, Drilling Rigs, Etc.



DIESEL PROGRESS

Two Promotions at Cleveland Diesel



Roger D. Williams



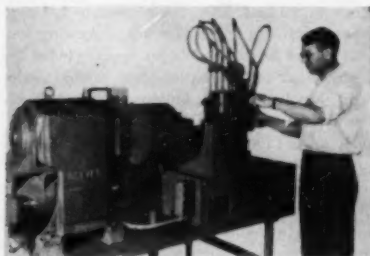
Tom E. Hughes

The announcement of the promotion of two key personnel of the Cleveland Engine Division of General Motors has been made by George W. Codrington, vice president of General Motors and general manager of Cleveland Diesel Division. Tom E. Hughes was named assistant general manager and Roger D. Williams became general sales manager, the post formerly held by Mr. Hughes. Mr. Hughes, a graduate of the University of Illinois, joined General Motors in 1933 as a helper in the test department. In 1935, he was transferred to the engineering department and on January 1, 1940, he was appointed assistant manager of Cleveland Diesel Engine Division office of Washington, D.C. On March 1, 1941, he was named manager of the Washington branch and held this position until he was transferred to Cleveland as general sales manager on April 1, 1949. Roger D. Williams attended Kenyon College and joined Cleveland Diesel in the test department in 1941. During World War II he served as a technician with the United States Navy in the Pacific. On January 1, 1946, he was transferred to the sales department in charge of industrial sales.

Launches Coastwise Tug

A new 102-foot coastwise tug, designed with an eye to the crew's comfort as well as operating efficiency, was launched last month by Socony-Vacuum Oil Company, Inc., New Orleans, La. The 1600-horsepower diesel driven boat is of all steel welded construction and was designed entirely by Socony-Vacuum marine engineers. The tug was constructed by the Avondale Marine Ways, Inc. of New Orleans. It will be No. 11 in the Flying Red Horse fleet.

Standardizes Fuel Pump Testing Procedure



J. Elwin Gates, Cummins laboratory technician, makes a final adjustment on a Cummins DD fuel pump prior to the start of a series of standard tests perfected by the company for all its fuel pumps.

Research by Cummins Engine Company, Inc., at Columbus, Indiana, has resulted in a method of standardizing Cummins fuel pump testing equip-

ment and testing procedures. Harold C. Hall, general service manager of the company, termed the study important to all users of Cummins diesels, "for if the fuel pump is not tested and set accurately, the correct performance of the engine on which the pump is installed cannot be assured." The method developed by the study is being used by Cummins dealers who maintain service locations from coast-to-coast, in Canada, and in practically all other industrialized nations throughout the world. Mr. Hall added, "The need for standard fuel pump testing is recognized by every diesel user as the best way to achieve uniform results. The hydraulic characteristics may differ between fuel pump stands and sometimes cause variable quantities of fuel to be delivered by the same pump

when tested on different stands. Cummins is now aiming at standard servicing methods and test procedures in order to assure Cummins users comparable results."

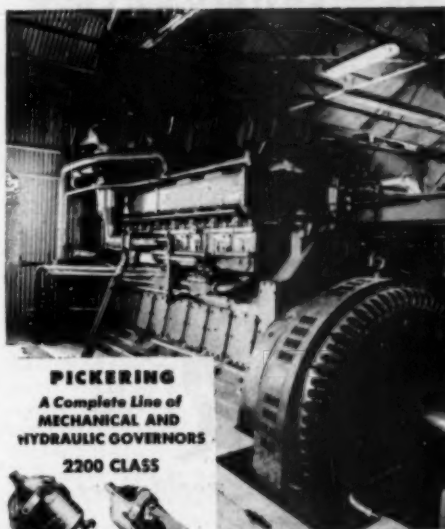
48 Diesel Buses

The Tucson Rapid Transit Co., Tucson, Arizona, recently placed into service 48 General Motors diesel buses equipped with 170-hp. 2-cycle GM diesels. These buses are 45 passenger capacity and are equipped with the automatic hydraulic drive which so vastly improves bus operation.

DIESEL ENGINE CATALOG is now available in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. **ORDER COUPON ON PAGE 79.**

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Synonym for dependability since 1862



Generating station of a midwestern oil company showing a battery of generators on which Pickering Governors are an integral part.

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2600 CLASS



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Constant Speed Variable Speed

For 89 years, Pickering Governors have met and anticipated the needs of American Industry. They have more than established a reputation for fully-dependable, long-term service under every type of operating condition.

Today, Pickering stands ready to supply the right governor for the job — to supply the governor that will maintain operating efficiency at its peak regardless of service conditions.

To consult Pickering Engineers may be your passport toward more efficient and economical operation of diesel equipment.



THE PICKERING GOVERNOR CO.

Established 1862

88 LLEWELLYN AVENUE • BLOOMFIELD, NEW JERSEY

Control Device

A new instrument that provides sensitive, instantaneous and accurate control of flow, temperature, pressure, liquid level and other industrial process variables has been developed by Minneapolis-Honeywell Regulator Company, Philadelphia 44, Pennsylvania. The device, the Tel-O-Set controller, is described by the company as the latest component in a series of new devices designed to improve process control. The other components are the differential converter, Tel-O-Set indicator and Tel-O-Set recorder. The controller was developed for use with the other three components. It is further described as a low-cost, easily installed, compact unit which provides maximum trouble-

free operation. In addition to its extreme sensitivity and rapid response to process change, the controller operates on a pneumatic balance principle which eliminates friction and lost motion. It is made in two types, one with fixed proportional band, the other with adjustable proportional band. The units are constructed of a number of coded, interchangeable sections separated by diaphragms. Except for manual adjustments of reset on the band unit, the controllers operate wholly in response to pneumatic signals.

42nd National Motor Boat Show

The 42nd National Motorboat Show will be held in Grand Central Palace, New York City, January

11-19, according to an announcement by George W. Codrington, president of the National Association of Engine and Boat Manufacturers, sponsors of the exhibition. Joseph E. Choate, manager of the National Motor Boat Show and secretary of NAEBM said, "The consensus of opinion among members of the boating industry is to hold a show as usual, in spite of material allocations curbing the normal production output of many builders. Even with curtailed production," Mr. Choate added, "the annual show best serves as the recognized point of contact between the boating industry and the boating public. Only through a national show can the builder and engine manufacturer distribute his product efficiently and equitably."

Members of the 1952 show committee are: George W. Codrington, vice-president of General Motors Corporation and general manager of its Cleveland Diesel Engine Division, Cleveland; John W. Mulford, president of the Gray Marine Motor Corporation, Detroit; Leon E. Travis, president of the Richardson Boat Company, Inc., North Tonawanda, N. Y.; Fred L. Hewitt, Jr., president of the Century Boat Company, Manistee, Mich.; and Ralph G. Klieforth, president of the Universal Motor Corporation, Oshkosh, Wisc.

Appointed District Representative



Frank McNamara

Appointment of Frank McNamara as a district representative for Caterpillar's western sales division has been announced by B. L. Hagglund, western sales manager. Mr. McNamara has been assigned to work with Caterpillar dealers in Napa, Eureka, Rio Vista, Marysville, Chico, Colusa, Petaluma, and Sacramento, California, and will headquarter in the latter city. He succeeds the late C. R. Johnson, for many years a Caterpillar representative in the west. Mr. McNamara joined Caterpillar in 1946 and until recently was district representative on the Atlantic coast.

Brochure Available

The Winger Construction Company of Ottumwa, Iowa have announced the availability of a new twenty-page brochure for friends, customers and others in the field. The booklet contains full page photographs and color illustrations showing projects carried on by the Winger firm. Included are power plant and industrial plant piping, equipment installation and buildings. The Wingers Barney, the father, and four sons, Henry, Lloyd, Walter and Clifford, who state they "welcome construction anywhere in America," have given particular attention to construction and equipment in the electric power plant field, working closely with many well-known consulting engineers. This team of five have directed projects in fourteen states.



DIESEL PROGRESS



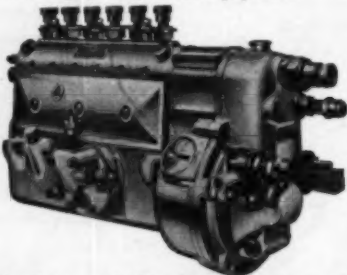
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Transport operators all over the world have learnt to trust this sign.

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Wherever vehicles fitted with C.A.V. Fuel Injection Equipment are exported — whether to Trondheim, Santiago, Hong-Kong or Sydney — there's a service agent or depot to give it the specialist attention needed for such high-precision equipment.



Fuel Injection and Electrical Equipment

Service Depots throughout the World

C.A.V. DIVISION OF LUCAS ELECTRICAL SERVICES INC., NEW YORK 19, N. Y.

Sales Office:

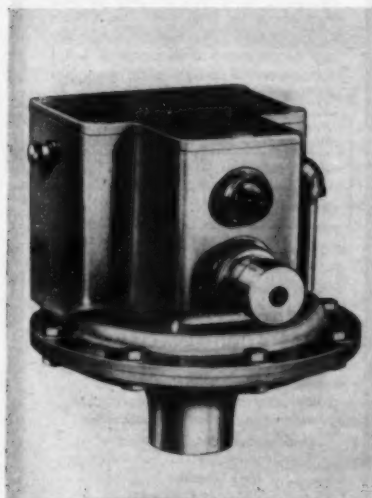
14820 DETROIT AVENUE, CLEVELAND 7, OHIO

Gulf Workboat



One of the newest tug-boats engaged in moving oilwell drilling rigs and barges off the Louisiana-Texas coast is the *Susan G.* The boat was completed last Spring by the Burton Shipbuilding Company for Savoie and Guidry and has already moved some of the biggest rigs in this section of the Gulf. The *Susan G.* is a 60 foot craft of steel construction with a 17 ft. beam and a draft of 5 ft. The power, furnished by George Engine Company of Harvey, Louisiana consists of two GM 6-110 diesels. Turning at 1600 rpm., the engines move the boat at 10½ knots. Twin screws, 44-inches by 30-inches, are driven through 3:1 reduction. A fuel tankage of 5000 gallons gives her a cruising radius of 2500 miles.

Engine Protection Against Crankcase Explosion



A crankcase explosion can cause serious damage to an engine if it is not shut-down immediately. A new device makes this shut-down automatic when such an explosion occurs. Designed to help prevent explosions and excessive damage caused by failure of internal parts, Paxton-Mitchell Company has developed and is marketing its P-M Engine Protector. The mechanism operates on the diaphragm principle. When pressure is present in the crankcase, the diaphragm operates a relay which in turn operates the stop relay in the control circuit and automatically shuts the engine down. Circuits are provided which operate the low lube oil alarm bell and isolate the unit.

The manufacturers claim that this means a shut-down of the engine will be effected before excessive damage can be caused by broken liners, broken pistons, broken rings or any other cause which would create pressure in the crankcase. A connection to the airbox is provided for testing purposes and the maker recommends that a test be made at the start of each run to make certain the device is in proper working order. The unit is sealed, eliminating the possibility of damage from water or cleaning solutions used in washing down the engine.

The engine protector can be used on all types of diesel engines. Because it is shipped as a packaged unit, complete and ready for installation with all

internal wiring factory assembled, installation is simple and can be made with a minimum of time and expense. A number of the P-M Engine Protectors have already been placed in service in test applications and, according to a company spokesman, have in three cases shut-down the engine before excessive damage resulted.

For descriptive literature and prices, mail your inquiry to DIESEL PROGRESS, File 92, P.O. Box 8458, Cole Station, Los Angeles 46, California.

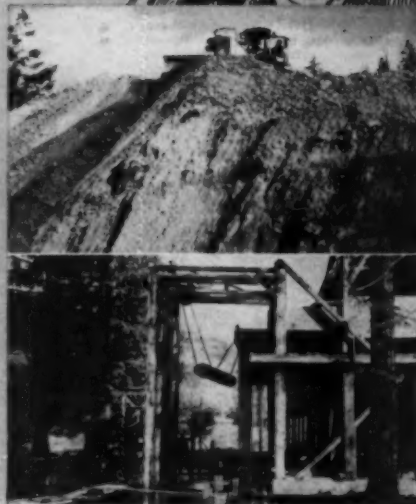
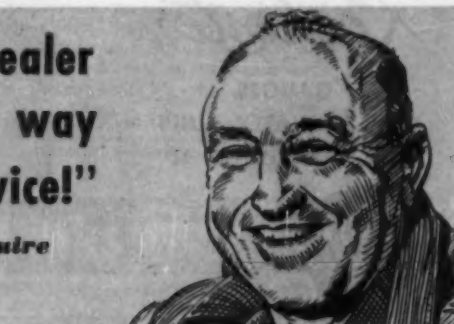
DIESEL ENGINE CATALOG is now available in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. **ORDER COUPON ON PAGE 79.**

"My Winslow Dealer goes out of his way to give me service!"

K. B. McGuire
Ft. Bragg, Calif.

Kelly B. McGuire and his two sons are prominent western lumbermen, with logging and saw-mill operations in the rugged mountains on northern California's coast. Theirs is the vital job of helping to supply timber for defense and civilian uses, so their tractors, trucks and stationary engines need all the protection that fine lubricants and efficient filtration can give them. This makes it all the more important when Mr. McGuire says:

"I have been using Winslow Elements for over 12 years. Away back in the beginning I learned the need for adequate filtration, and through all these years Winslow Elements have given economical and dependable performance. Just as important, my local Winslow dealer has gone out of his way to give me helpful service at all times."



Lubricants needed all the protection they could get when roads were built (upper) to McGuire lumbering operations. Lower is one of McGuire's log hoists.



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No wonder practically all leading tractor manufacturers have been specifying Rochester Gauges as standard equipment for over 35 years.

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Three New Appointments



John Seagren



Harvey W. Hanners



George F. Nolstein

John Seagren has been appointed chief engineer of the National Supply Company's Engine Division at Springfield, Ohio, according to an announcement by Mr. F. H. Kilberry, general manager of the division. At the same time, Mr. Kilberry announced the appointments of Harvey W. Hanners and George F. Nolstein as chief research engineer and consulting engineer respectively. A native of Sweden, Mr. Seagren received a degree in mechanical engineering in 1920 from the Chalmers Technical University in Gothenburg and acquired extensive experience in the shops, testing departments and engineering offices of two Swedish concerns. He subsequently worked with Fairbanks-Morse, Northern Pump, and American Locomotive. Mr. Nolstein has been with National Supply since 1927 and served as chief engineer and director of research before the present appointment. Mr. Hanners came to National Supply in 1941 as a development and research engineer and chief engineer. He has worked with Fairbanks-Morse and spent eight years with Allis-Chalmers specializing in fuel injection and related problems.

New Sales and Service Facilities



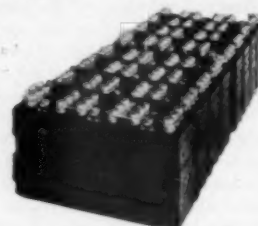
Operators of Cummins diesels in Southern Indiana and Western Kentucky now have available new sales and service facilities at Evansville, Indiana. Located on U. S. Highway 41 at 1650 North Fares Avenue, Cummins Diesel Sales of Evansville, Inc., is a subsidiary of Cummins Diesel Sales of Louisville, Inc., 2209 Taylorsville Road, Louisville, Kentucky. Louis M. Willinger is president of the dealership. At Evansville, F. S. Griffith is manager, Henry B. List is in charge of service, and Frank Spitzer heads the parts department.

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T-TYPE BATTERY
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2 models—THR-30, THR-44



**SAVES UP TO 100 MAN HOURS
PER YEAR PER LOCOMOTIVE**

Because the NICAD nickel cadmium storage battery requires less maintenance you save precious man hours and, at the same time, are assured of reliable, foolproof battery service throughout its long life. The T-Type NICAD battery has an exceptionally high ampere rate of discharge at useful voltage, a vital consideration in engine-starting applications.

BATTERY TYPE	AMPERE HOURS	NUMBER OF CELLS	GROUP TRAY LENGTH A	TRAY WIDTH B	WEIGHT LBS.
THR-30	145	48	35 1/2"	8"	1825
THR-44	210	48	44 1/2"	11"	2675

THR-30—Interchangeable with 17-plate, 248 A.H. Lead Acid Batteries
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Exceptionally Long Life	Low Internal Resistance
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Uses Standard Charging Equipment

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Three switches are provided for testing, audible alarm cut-off, and a safety switch for emergency shut-down.

For further information write for Bulletin 407

SYNCHRO-START PRODUCTS, INC.
8141 NORTH RIDGEWAY AVENUE, SKOKIE, ILLINOIS.

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 16 of DIESEL ENGINE CATALOG which is now available, entirely revised and rewritten. This is the 16th edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the DIESEL ENGINE CATALOG gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him all data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Advance orders are now being accepted for the limited edition. Price \$10.00 prepaid.

DIESEL PROGRESS

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Binks closed-type DIESEL COOLING SYSTEMS

produce higher engine efficiency

Diesel engines may be operated at higher, more efficient temperatures with Binks Type "D" evaporative heat exchange coils, installed in a Binks natural or mechanical draft cooling tower. The Binks system is a closed one in which treated or soft water can economically be used for cooling purposes. Scale formation in jackets is eliminated. Exact temperature control is obtained. Diesel "down time" is cut. Breakdown insurance rates are lower.

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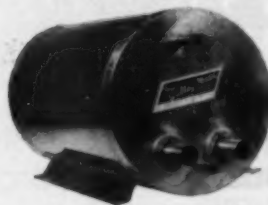
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GALLEY MAID



- Ideal for limited installation space.
- Approximately 3 gallon capacity.
- 14 lbs. (dry), 15" long, 9" in diam.
- Hel-Arc welded monel tank with aluminum outer shell and feltrok insulation.

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CHECK AND COMPARE THESE FEATURES

- Starting motor can be mounted more easily and in more positions.
- Requires no adjusting linkage—solenoïd can be placed in any convenient position.
- Simple in design—has fewer parts—needs fewer adjustments.

It takes a truly outstanding product to receive over 85,000,000 endorsements. Yet, that's the number of Bendix Drives that have been installed. No other starter drive approaches this record of outstanding performance. That is why, whatever your type of diesel or whatever its purpose, it will pay you to specify Bendix® Starter Drive for the most economical installation and dependable performance.

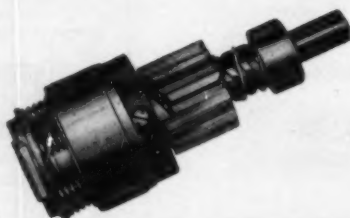
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REDUCE YOUR ATOMIZER REPAIR BILL BY 95%

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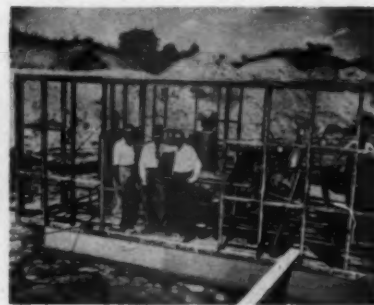
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The **MERLIN** Service Master

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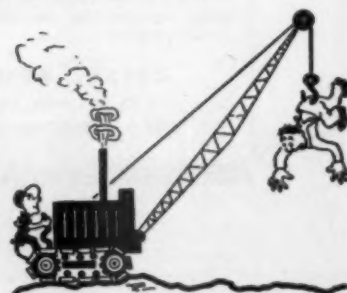
Gravel Pumping Dredge



Pictured on Consumers Sand and Gravel Company's new dredge are, left to right, Adrian Klepper, partner in the company; Jack Deakins, sales engineer, Earle Equipment Company; and Richard H. Butcher, Consumer's general manager.

Several unique features of design engineered into a new gravel pumping dredge recently put into operation by the Consumers Sand and Gravel Company of Kalamazoo, Michigan, have greatly speeded up the company's production of gravel, road stone and plastering sand. The company reports that these features have contributed to a more even flow of material, reduced hazards to driving machinery and greater freedom from shutdowns than is usually experienced in such a pumping operation. Instead of two or three engines or a combination of engines and electric motors quite often used in such equipment, this dredge is driven by a single power plant. Main pump, priming pumps, stone ladder and winches are all driven through an ingenious system of power take-offs by one GM 6-110 diesel. The dredge is therefore ready to operate at the press of a button. The clutch mechanism of the eight-inch Hubscher stone ladder is engineered so that it can be reversed and also that "slippage" occurs when a heavy obstruction such as an embedded log or boulder is encountered. It is also useful in the event that the ladder is buried by a cave-in.

The dredge is 100 feet long by 16 feet wide and is built of 1/4-inch plate. It has nine water-tight bulkheads and will remain afloat with any two of the compartments flooded. Carefully designed floatation assures perfect "trim" of the dredge regardless of position of the ladder. The suction pipe is 75 feet long and will dredge to a depth of 50 feet without adding additional pipe. The dredge was built by The Earle Equipment Company, Detroit Diesel Division distributors in Detroit, Michigan. Jack Deakins sales engineer of the Earle Company, was the designer.



DIESEL PROGRESS

Wix Galley Maid No. 3

Wix Cooler Company is happy to announce another addition to their line of marine products. The Wix Galley Maid No. 3 which will be of interest to commercial craft owners as well as pleasure craft owners, has just been developed. No. 3 provides, as do the other Galley Maids manufactured by this company, hot water at all times through the use of waste engine heat. The novel aspect of this latest addition is the handy size for limited installation use. The finest of materials are found in the No. 3. Here is a Heli-Arc welded, monel metal tank with an aluminum outer shell and feltrok insulation. Only 14 pounds in weight (dry), the model No. 3 has approximately a 3 gallon capacity. Easy installation is possible because it's only 15 inches long with a 9 inch diameter. For full information on this new model No. 3 Galley Maid write to Wix Cooler Company, 2900 Westlake North, Seattle 9, Washington.

Battery Life Prolonged



Chief Engineer Rollo A. Wells checking main battery bank.

In December 1947, the Port of Oakland, California bought a Navy fireboat, veteran of Pearl Harbor. At the same time, Pioneers, Inc., also of Oakland, was introducing a battery compound called Battery AD-X2, claimed to reduce battery costs by increasing new battery life by 100% and by rejuvenating old but sound batteries. On checking the standby batteries on the fireboat, five were found sound enough to warrant treatment with the new compound. Nine other batteries were replaced. After about a year and a half, the five old batteries were found to have a slightly greater capacity than the nine new ones. As a result of the test, all equipment used by the Port of Oakland has been treated with Battery AD-X2. The fireboat is propelled by two unsupercharged 6-cylinder, 650 hp. MacIntosh and Seymour diesels. On the main deck, three pumps are driven by three supercharged 8-cylinder 300 hp. Buda engines. These deck pumps are 2-stage centrifugal 2000 gal. per minute with exhaust ejector priming made by United Iron Works, Oakland. The two main pumps are electric driven, single stage centrifugal 2000 gal. per minute made by Frederick Iron and Steel Co. of Frederick, Md.

DIESEL ENGINE CATALOG is now available in its Sixteenth expanded Edition. Completely revised and re-edited, it is an invaluable aid to design engineers and buyers. ORDER COUPON ON PAGE 79.

NOVEMBER 1951


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Mutual's Chromates are widely used throughout industry to inhibit corrosion. In the diesel field, they are used advantageously in the water cooling systems of locomotives, marine and stationary diesels—in closed engine jackets, open towers and evaporative condensers. Chromates are particularly effective in combatting corrosion of engine cylinder liners.

Mutual is the oldest and largest manufacturer of Chromium Chemicals. Our technical staff will be glad to advise you on the application of Chromates in your corrosion problems.

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PREMAX
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 OF COMPRESSION AND
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 OF EVERY TYPE OF DIESEL ENGINE

ONE OF THE FEATURES
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Successive readings
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 change from firing pressure to
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 Bulletin 294

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Governors give exact
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to meet the varying
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PIERCE governors engineered specifically for Diesels assure long, trouble-free operation . . . usually for the life of the engine. Many Diesels feature PIERCE as standard equipment to assure maximum protection, better performance and less maintenance.

PIERCE replacement governors to fit most engines are available through your local distributor.

For your distributor's name or for specific information on new engine design or special governing problems, write or call Sales Department, Pierce Governors, 1403 Ohio Ave., Box 1,000, Anderson, Indiana.

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"FIRST NAME IN GOVERNORS"

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The Fram Filcon Lube Oil Filter and Filcon Fuel Oil Filter will cut diesel down-time for you by keeping vital moving parts free from engine-killing dirt, dust, grit, sludge and abrasives. For full, FREE information, write: FRAM CORPORATION, Providence 16, R. I. In Canada: J. C. Adams Co., Ltd., Toronto, Ontario.

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Inland River Reports

By DAVID I. DAY

C. E. SPRINGSTUN mailed kodak pictures Sept. 20 from Memphis showing a new unnamed diesel towboat, 380-hp. twin diesels, from Cummins Engine Co. We understand the twin-engined craft was going to New Orleans on one screw to be taken to some point in South America. Barbour Metal Boat Works, St. Louis, built the export craft. Capt. Win. Gestring took her to the gulf.

OUR CONGRATULATIONS to the Walter G. Houglund Lines, Paducah, Ky., on the performance lately of the *Susan Houglund*, coming up the Mississippi and Ohio regularly with up to 11,000 tons of oil. She is Nashville-built, with General Motors twin diesels, totaling 3200 hp. W. L. Bachus is the master with Eugene Poindexter in charge of the engine room.

THE CLAUDE TULLY of the Patton-Tully Transportation Co., Memphis, Tenn., has made autumn headlines towing alcohol up from the south to Kobuta, Pa. Each tow is valued at \$50,000,000 which is probably tops in value on the rivers since the boats started running the Ohio and Mississippi back in 1811.

NEWSPAPERS STARTED anew singing the swansong of the steamers when the *Jason* was sold by the Union Barge Line. UBL already owns and operates fine new and older diesel pushers and is headed away from steam. The *Jason* is the duplicate of the *Alexander Mackenzie* on the upper Mississippi. They were the last of the big white sternwheel steamers. Both boats and all others of the type will eventually be displaced by more economical diesel power.

THE UNION BARGE LINE'S *Peace* will end the summer season on the upper Mississippi, always regularly employed, however on the upper Ohio. The *Peace* is towing grain on the Father of Waters. This boat is Dravo-built, powered by Winton diesels, 800 hp., and came off the ways about 17 years ago. She is 154 x 54 x 8 approximately and still a nice looker.

ONE OF the most faithful towboats on the rivers is the well-known *Stanolind A* of the Standard Oil Company of Indiana, built at Manitowoc, Wis., in 1940 and thus is completing 11 years of continuous service. The vessel is 144 x 35 x 8.5, powered by twin Busch-Sulzer diesels generating 1200 hp. and has an all-welded steel hull. When seen she was pushing six barges of gasoline nearing Bettendorf, Iowa on the Mississippi. However a good part of her work of late has been on the Illinois. Capt. Joe Means is in command with Clem Scharnhorst, chief engineer.



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NEAR EVANSVILLE we witnessed recently the first trip of the M.V. *W. J. Kearns* on her way from the shipyard at St. Louis to her home port of Aliquippa, Pa. The boat is the "infant member" of the famed Jones & Laughlin fleet at Pittsburgh. The new boat for the coal and steel trade of the upper Ohio is a nice-looking little pusher, powered by twin Caterpillars, 340 hp., as reinforced by Kort Nozzles. She is lightly streamlined, painted white, with green trimming and red lettering.

THE *NORTHERN*, formerly the *Bernard B. Walker*, has been one of the most active towboats in the oil trade all summer and fall, going the full length to St. Paul, Minn. She is in the John I. Hay fleet of Chicago, powered by twin Fairbanks-Morse diesel engines, totaling 3200 hp. The boat was built not long ago at the Walker Shipyards, Pascagoula, Miss.

THE *FERDINAND* (with a picture of a bull painted on the pilot house) powered by a Caterpillar, 270 hp., recently had minor repairs at Peoria, Ill., and set to work the next day on the Illinois. The new *Bull Durham* with twin Caterpillars was observed in September pushing down the Mississippi not far above the mouth of the Ohio. She was headed for Good Hope, La. The *Ferdinand* was built at St. Louis Ship, the *Bull Durham* came from the Nashville, Tenn., Bridge Company yards. The Bull Towing Co., owned by Capt. E. T. Bull, has offices at Joliet and is a real factor in the river oil trade.

A VERY pleasing sight this autumn is the *Frank W. Banta* of the Plaquemine Towing Co. She has two General Motors engines (Cleveland) and has a rating of 1800 hp. The boat pushes 50,000 barrels of oil and has bunkers holding fuel oil good for a cruising range of 3000 miles.

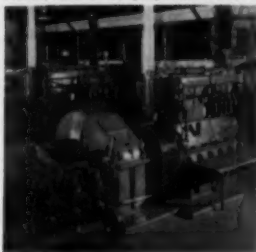
THE *SPONGIE II* is the prettiest of the dieselized pleasure boats launched on the river this year. She was built by the Kelly Shops at Wheeling, West Virginia, for W. A. Dick, a prominent Wheeling citizen. The boat is all-steel, 50 x 15 feet, with a 200 hp. General Motors engine. Mr. Dick plans to take 25 YMCA boys on a 45-day trip down the Mississippi when school is out.

AND EQUALLY pleased to see the big fine new 3000-hp. *R. H. McElroy* up near Huntington on the Ohio River pushing four barges of oil and a boiler boat. This was the first journey up this river for the pride pusher of the Pure Oil Company fleet. Her twin Fairbanks-Morse engines were giving the boat plenty of upstream speed.

A NICE ASSEMBLAGE witnessed the recent launching of the 1800-hp. *Lady Linda* at the yards of St. Louis Shipbuilding & Steel Company. The boat is owned by the Inland Oil & Transport Co., St. Louis and is in the Helena, Ark., to St. Louis oil trade. However, we saw her going up the Ohio to Louisville on one trip. She is 116 x 30 x 10.6 with twin General Motors engines and Contraguide rudders. G-M generating sets, Fairbanks-Morse water pressure sets, a Gardner-Denver fire pump, Carlisle & Finch searchlights and Perkins running lights are recalled as a part of the equipment.

NOVEMBER 1951

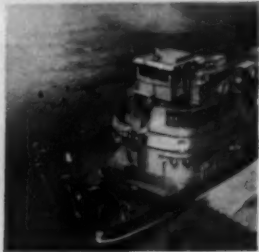
PUMPING . . . Diesel installation, Antelope Station, Union Oil Company of California.



ROCK CRUSHING . . . International Harvester Company Model UG24 Portable Diesel Units.



SHIPPING . . . Motor ship "Anker L. Christy," Triple Couper-Bessmer diesel.



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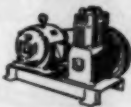


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West Coast Diesel News

By FRED M. BURT

UNDER CONSTRUCTION by the Union Diesel Engine Co., Oakland, two 1,000 kva. diesel generating sets for the Naval radio station at Wahiawa, Oahu, Hawaiian Islands; model V-8, 8-cyl. 1270-hp. diesel engines with Elliott turbo-chargers, and G.E. generators.

FOR USE in the new shrimping beds off the Florida coast (Tortuga Keys) a large number of 63-65 ft. shrimp boats built by Southern Shipbuilding Corp., Jacksonville, are using Hallett EC-1, 1-cyl. 5-hp., air-cooled diesels as standard auxiliary units.

FROM Oswald's Machine Works, San Francisco, a 65-hp. Murphy diesel for Marysville (Calif.) contractor H. L. Parker to replace a gasoline engine in a Northwest model 78 dragline in use on the Folsom Dam contract.

ENDING one year's occupancy of modern new quarters at Fisherman's Wharf, San Francisco, King-Knight Co., Buda and Sterling diesel distributors, are already over-crowded by pressure of business including building of such units as the 15-kw. generating set for S. S. Pellas Co. for export to a Nicaragua plantation, for irrigation pump power and lighting. Excess power from generating use, transmitted by V-belt drive for pumping; special sheave combined with flywheel coupling.

FOR Voice of America broadcast use in various foreign locations, 25 Worthington, (1320-hp. diesel engines) 900-kw. generating sets to be equipped with Vapor Phase (Engineering Controls, Inc.) cooling for even temperature in any climate, hot or cold.

FOR Pacific Freight Lines, Los Angeles, eight Kenworth trucks powered with 275-hp. super-charged Cummins diesels serviced by Cummins Service and Sales, Los Angeles.

FOR THE San Francisco Fire Dept. Signal Station for standby electric power for fire alarm, police radio, and traffic lights, a Buda diesel (from King-Knight Co.) driving a 25-kw., d.c. Century generator and a 7½-kw. a.c. General Electric generator arranged in tandem.

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THE 114-ft. fishery research vessel *Yellowfin*, operated by the California Marine Fisheries Laboratory, Terminal Island, for her first summer sardine cruise was outfitted with two new auxiliaries, 4-cyl. G.M. diesels driving 40-kw. generators. Main power from twin Atlas Imperial diesels.

FOR Mike Malfatino & Sons Construction Co., Pittsburg, Calif., a model 20, 150-hp. Murphy diesel from Oswald's Machine Works, San Francisco, to repower a model 6, Northwest shovel, used in road work.

FOR THE Western Pacific Railroad to power operation of the automatic T.C.S. (Traffic Control System) at sidings where commercial power is not available (from King-Knight Co.) 24 3-kw. generating sets equipped with King-Knight designed automatic starters; (two sets at each siding, one for standby while other operates constantly). Power from 2-cyl. Buda 2BD-77 diesels.

THE NEW 48-ft. *Shirley*, fishing boat built by Sagstad Shipyard for Ray Thomassen, Petersburg, Alaska is powered with a 105-hp. Cummins diesel from Cummins Diesel Sales, Seattle, driving through a 3:1 Twin Disc reduction gear; a 1-kw. Onan diesel generating set for auxiliary power.

COMPLETED recently by Pacific Gas & Electric Co., installation on the 34-in. gas line from Texas, 15 GMW, 10-cyl. 24-hp. Cooper Bessemer natural gas engine driven compressors used for pumping units with about 700,000 cu. ft. total daily capacity; six at the Topke (Calif.) and seven at the Hinkley stations.

FROM Caesar Baldassari, San Francisco, 42 units to date, Onan 1-cyl., 2½-kw. diesel-electric sets for Southern Pacific use in cabooses for rear end power for two-way radio communication with diesel freight engines. Head end power from locomotive diesel generators via transformers.

FROM Oswald's Machine Works, San Francisco, for J. D. Williams, Alviso, Calif., a model 6-D, 3-cyl., 31-hp. Sheppard diesel for use as an auxiliary in a sailing vessel.

Equipped with a 5-hp. Crofton diesel engine for operation of refrigeration and pumps, for the albacore season, the *Betsy Ross II*, working out of Avalon, Catalina Island, Calif.



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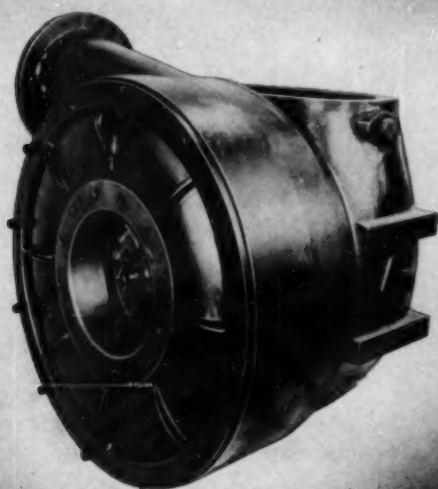
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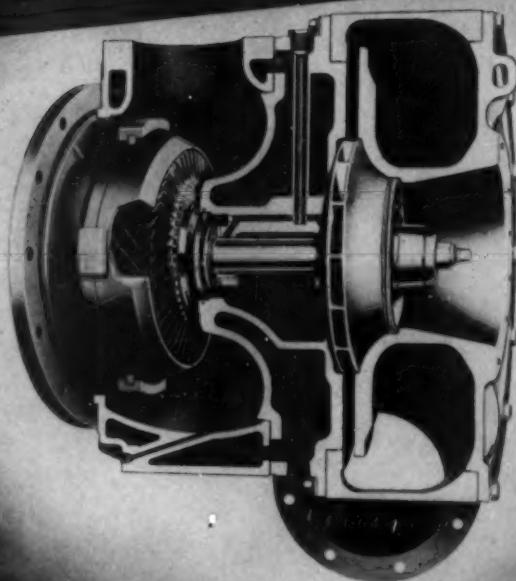
Adeco Products, Inc.....	94	Madison-Kipp Corp.....	22
Aerofin Corporation.....	94	Marquette Metal Products Co., The.....	2
Aeroquip Corporation.....	67	Maxim Silencer Company, The.....	70
American Air Filter Co., Inc.....	10	Merlin Engineering Co., Ltd., The.....	90
American Bosch Corporation.....	11	Mid-Continent Petroleum Corp.....	74
Ashland Oil & Refining Co.....	30	Murray & Tregurtha, Inc.....	82
		Mutual Chemical Co. of America.....	91
Bacharach Industrial Instrument Co.....	91		
Binks Manufacturing Co.....	89	National Supply Co., The.....	26
Briggs Filtration Co., The.....	72	Nickel Cadmium Battery Corp.....	88
Brown & Sharpe Mfg. Co.....	76	Nordberg Mfg. Co.....	3
		Nugent & Co., Inc., Wm. W.....	77
C.A.V. Ltd.....	86		
Cities Service Oil Co.....	7	Petrometer Corp.....	92
Cleveland Diesel Engine Div., General Motors Corp.....	21	Pickering Governor Co., The.....	85
Columbia Electric Mfg. Co.....	96	Pierce Governor.....	92
Cooper-Bessemer Corp.....	Fourth Cover	Purolator Products, Inc.....	93
Detroit Diesel Engine Div., General Motors Corp.....	4	Quincy Compressor Co.....	93
Diamond Chain Company, Inc.....	69		
		Read Standard Corporation.....	71
Eaton Manufacturing Co.....	81	Rochester Manufacturing Co., Inc.....	88
Eclipse Machine Div., Bendix Aviation Corp.....	90		
Electric Machinery Mfg. Co.....	12	Sarco Company, Inc.....	95
Electro-Motive Div., General Motors Corp.....	6	Schoonmaker Co., A. G.....	95
Elliott Company.....	Third Cover	Scintilla Magneto Div., Bendix Aviation Corp.....	23
Engineering Controls, Inc.....	75	Shell Oil Company, Inc.....	24-25
Erie Forge Co.....	20	Sinclair Refining Co.....	27
		Skinner Purifiers Div., Bendix Aviation Corp.....	67
Fairbanks, Morse & Co.....	17	Standard Oil Co. of Calif.....	5
Fram Corporation.....	92	Standard Oil Co. (Indiana).....	13
Fulton Sylphon Div., Robertshaw-Fulton Controls Co.....	32	Sterling Engine Co.....	84
		Stewart & Stevenson Services.....	14
General Motors Corp., Cleveland Diesel Engine Div.....	21	Sticht Co., Herman H.....	94
Detroit Diesel Engine Div.....	4	Sturtevant Co., P. A.....	94
Electro-Motive Div.....	6	Sweeney Company, B. K.....	76
Guth Company.....	95	Synchro-Start Products, Inc.....	89
Harnischfeger Corp., P & H Diesel Div.....	19	Texas Co., The.....	Second Cover-1
Hilliard Corporation.....	95	Thomas Flexible Coupling Co.....	68
Hunt-Spiller Manufacturing Corp.....	8	Tide Water Associated Oil Co.....	18
		Trane Company, The.....	92
Illinois Testing Laboratories, Inc.....	83	Tuthill Pump Company.....	96
International Harvester Co.....	9		
Interstate Training Service.....	92	Union Diesel Engine Co.....	80
		United States Hoffman Machinery Corp.....	94
Johnson Bronze Co.....	73	Utilities Engineering Institute.....	95
Kato Engineering Co.....	94	Van Der Horst Corp. of America.....	92
Koppers Company, Inc.....	15	Vellumoid Co., The.....	92
Kurz & Root Co.....	95		
		Washington Iron Works, Inc.....	67
LaNova Corp.....	94	Westinghouse Electric Corp.....	16
		Winslow Engineering Co.....	87
		Wix Cooler Co.....	89
		Worthington Pump and Machinery Corp.....	29

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